

**ANSONIA THE
BRASS
AND COPPER CO.**
MANUFACTURERS OF
BRASS AND COPPER

Seamless Tubes, Sheets, Rods and Wire.

Ingot Copper.

SOLE MANUFACTURERS

Tobin Bronze
(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round, Square and Hexagon Bars, for Pump Piston Rods and Bolt Forgings.

19 & 21 CLIFF Street, - - New York.

THE

New Haven Copper Co.,
SOLE MAKERS OF

POLISHED COPPER

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND DEALERS IN

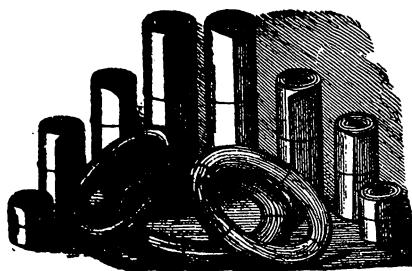
BRAZIERS' & SHEATHING COPPER,

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.



Waterbury Brass Co.

Established 1845.

Sheet, Roll and Platers' Brass, German Silver, Copper, Brass and German Silver Wire, Brass and Copper Tubing.

COPPER RIVETS AND BURRS,

PERCUSSION CAPS,

TAPE MEASURES,

METALLIC EYELETS,

Brass Kettles, Brass Tags, Powder Flasks,

Shot Pouches, &c.,

AND SMALL BRASS WARES OF EVERY DESCRIPTION.

HICK'S PRIMERS. BERDAN PRIMERS.

Cartridge Metal in Sheets or Shells a Specialty.

Sole Agents for the CAPEWELL MFG. CO.'S Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Providence, R. I.

MILLS AT WATERBURY, CONN.

WHEN IN WANT OF ANYTHING IN

BRASS AND COPPER

WRITE

ROME BRASS & COPPER CO.,

ROME, N. Y.

MATTHIESSEN & HEGELER ZINC CO.,

LA SALLE, ILLINOIS,

SMELTERS OF SPELTER

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc cut to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

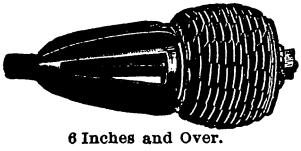
BRASS GOODS MFG. CO.,

Mfrs. of Stamped Brass, Silver and Nickled Goods, Brass Labels for Cans and Rubber Moulds.

BRONZE DOOR KNOBS

Bronze and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin Cushion Business Cards, Mucilage Brushes. Novelties of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.



The Peerless STEEL FLUE CLEANER,
FROM 1 1/2 TO 10 IN.
For descriptive circular and prices ad-
dress the Manufacturer,

Jas. T. Mackay, St. Louis, Mo.



HENDRICKS BROTHERS,
Proprietors of the
Belleville Copper Rolling Mills,

Manufacturers of
Braziers', Bolt and Sheathing COPPER.
COPPER WIRE AND RIVETS.

Importers and Dealers in
Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

THE PLUME & ATWOOD MFG. CO.

MANUFACTURERS OF

Sheet and Roll Brass

—AND—
WIRE,

GERMAN SILVER AND GILDING METAL,
COPPER RIVETS AND BURRS, COP-
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,
Kerosene Burners, Lamp
Trimmings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,
THOMASTON, CONN. | FACTORIES:
WATERBURY, CONN.

SCOVILL MFG. COMPANY,

Manufacturers of

BRASS

Sheet, Wire, Tubes.

BUTT HINGES,

BUTTONS,

LAMP GOODS,

NOVELTIES,

PURE ALUMINUM

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

428 Broome Street, New York.
210 Lake Street, Chicago.
29 High Street, Boston.

JOHN DAVOL & SONS,

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

COPPER, TIN, SPELTER,
LEAD, ANTIMONY.

100 John Street, - New York.

WILLIAM S. FEARING.

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

Sheet Brass, Fancy Sheet Brass,
German Silver, Copper, Brass
and German Silver Wire,
Brazed and Seamless Brass and
Copper Tubes, Brass and Cop-
per Rods, Brass Ferrules,
Pure Copper Wire,
Sheet and Ingot Copper, Spelter,
Tin, Antimony, Lead, &c.

MISSOURI

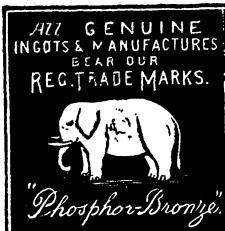
METAL COMPANY,

923 Security Building,

ST. LOUIS.

SPELTER.

ELEPHANT BRAND



PHOSPHOR-BRONZE
 INGOTS, CASTINGS, WIRE, SHEET &c.
 THE PHOSPHOR BRONZE SMELTING CO. LIMITED
 2200 WASHINGTON AVE., PHILADELPHIA, PA.
 ORIGINAL MANUFACTURERS OF PHOSPHOR-BRONZE IN THE UNITED STATES AND SOLE MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.

PHOSPHOR BRONZE.

Parsons' Manganese Bronze and White Brass.

MADE IN THE UNITED STATES EXCLUSIVELY BY

**THE WILLIAM CRAMP & SONS SHIP and ENGINE BUILDING CO.,
PHILADELPHIA, PA.**

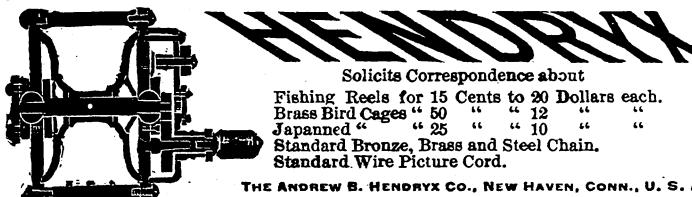
MANGANESE BRONZE PROPELLERS

— ARE USED BY THE —

Cunard, Pacific Mail, Hamburg American, White Star, International, Morgan, Canadian Pacific, North German Lloyds and many other Steam Ship Companies, and principal Naval Powers.

Parsons' White Brass ; the Most Approved Anti-Friction Metal.

G. DOUGLAS PETRIE, Agent, Nos. 39 & 41 Cortlandt Street, New York.



Solicits Correspondence about
 Fishing Reels for 15 Cents to 20 Dollars each.
 Brass Bird Cages " 50 " 12 "
 Japanned " 25 " 10 "
 Standard Bronze, Brass and Steel Chain.
 Standard Wire Picture Cord.

THE ANDREW B. HENDRICK CO., NEW HAVEN, CONN., U. S. A.



THE F. L. GAYLORD CO.,
 — MANUFACTURERS —

Aluminum Bronze Castings, Aluminum Bronze Sheets, Aluminum Bronze Ingots and Pure Aluminum Castings.

Box 1147, Ansonia, Conn.

Rough Casting of Aluminum.

Aluminum Bronze, German Silver Bronze and all kinds of Metals. Manufacturers of Chandeliers, Metal Picture Frames, Ink Stands, Figures, Statues, etc. Stair Carpet Holders a Specialty.

St. Louis Bronze & Aluminum Works,
 3741-3743 North Broadway,
 ST. LOUIS, MO.

EVANS FRICTION CONES.

For regulating the speed of machines automatically or by hand. Thousands of sets in operation driving all kinds of machinery which require from 1 to 50 H.P. Address Evans Friction Cone Co., 85 Water Street, Boston, Mass.

THE CRESCE NT TRY IT!
 AND YOU WILL USE NO OTHER
 TRADE MARK
THE CRESCE NT BRAND PHOSPHOR TIN.
 THE HIGHEST AND RICHEST GRADE MADE.
 MANUFACTURED ONLY BY
 THE CRESCE NT PHOSPHORIZED METAL CO.
 OFFICE AND WORKS
 2107 2109 AND 2111 INDIANA AV. PHILADELPHIA, PA.

CROWN SMELTING COMPANY,

Chester, Pa.

Bronze, Brass and Composition Castings.

Inventors and Sole Manufacturers of.

"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."

Manufacturers of PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.

Specifications in ingot metal or castings.

The W. W. & R. M. KEYS CO.,

Bronze,
 Composition and Brass Castings of all kinds, also Babbitt Metals

BRIDGEPORT, CONN.

PHOSPHOR-TIN

BY USING MY PHOSPHOR TIN MANUFACTURERS CAN MAKE ANY DESIRED GRADE OF PHOSPHOR BRONZE THEMSELVES. BY THE SIMPLE PROCESS OF MELTING. MUCH CHEAPER THAN THEY ARE NOW TO BE HAD IN THE MARKET. NEW OR OLD COPPER CAN BE USED. FOR CIRCULARS ADDRESS HALK & NAUMANN, NEW YORK. SOLE AGENTS FOR THE U.S. AND CANADA. S. PEARL

The American Metal Co.

(LIMITED),
 Levin Building, 80 Wall St., New York.
 P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.
 TIN, LEAD, SPELTER, ANTIMONY, NICKEL,
 ALUMINUM, BULLION, IRON.

Advances made on Consignments.

AGENTS FOR
 Henry R. Merton & Co., London.
 Metallgesellschaft, Frankfort-on-Main.
 Williams, Foster & Co. Ltd., Swansea.

BEST, FOX & CO.,

25th Street and A. V. Ry. - PITTSBURG, PA.

SOLE MANUFACTURERS OF

CLIMAX BRONZE

FOR ALL PURPOSES.

CASTINGS from 1 oz. to 12,000 lbs.

A

Washburn & Moen Manuf'g Co.,

WORCESTER, MASS., NEW YORK CITY, CHICAGO.
MAKERS OF IRON, STEEL AND COPPER

EVERY VARIETY OF **WIRE** FOR ALL PURPOSES.
WIRE ROPE AND CABLE.

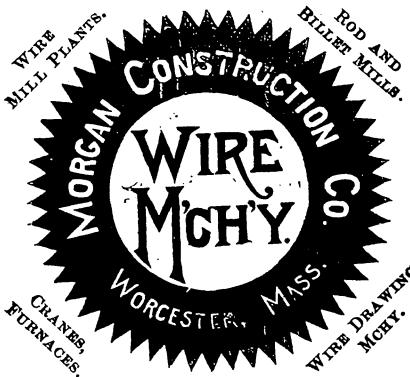
Hard and Soft Drawn Copper Wire for Electrical Purposes; Galvanized Iron and Steel Telegraph and Telephone Wire; Glidden Patent Steel Barb Wire; Watch and Clock Main Springs; Eyeglass Springs; Steel Wire for Needles and Drills; Patent Steel Wire Bale Ties; Pump Chain; Two Strand Twisted and Flat Twisted Fence Wire without Barbs; Fence Staples, Stretchers, &c.; Bright, Annealed, Tinned and Galvanized and Copper Wire, on Spools 1oz. to 1lb



SEND FOR PRICE-LISTS, CIRCULARS AND DESCRIPTIVE PAMPHLETS.

New York Warehouses, 16 Cliff St., and 241 Pearl St. Chicago Warehouse, 107 & 109 Lake St. San Francisco Warehouse, 8 & 10 Pine St.

Galvanized Iron Wire Rope for Ships' Rigging, &c. Galvanized Steel Wire Cables for Suspension Bridges. Transmission and Standing Ropes, Hoisting Ropes Tiller Ropes, Switch Ropes Copper, Iron and Tinned Sash Cord, Phosphor Bronze and Copper Wire Rope, Wire Clothes Lines, Picture Cord, Galvanized Wire Seizing, and all the Fixtures and Appliances required for use with the foregoing. The famous yachts Mayflower, Volunteer and Sachem are all rigged with our Wire Rope.



WM. MCFARLAND,
IRON FOUNDER,
TRENTON, - - N. J.

Chilled Cast Wire Dies
A SPECIALTY.

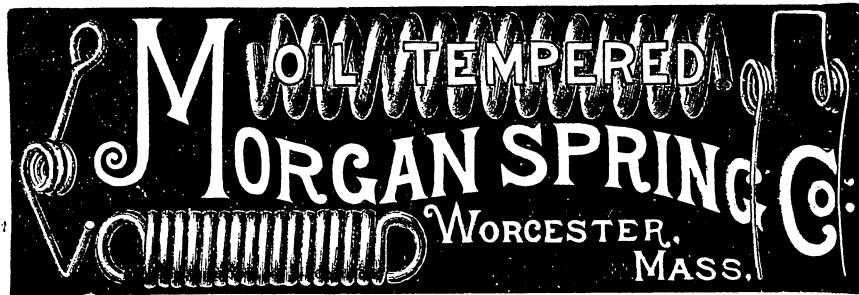
Any Size or Style Made at Short Notice.

J.F.KAY,
PASSAIC, N. J.
MACHINERY FOR MAKING OF
WIRE STRAND AND ROPE.
Winding, Stranding and Closing Ma-
chines, &c. Electric Wire and Cable
Machinery. Hemp Rope and Cordage Machinery.
Plans and Estimates.

SPRINGS—RIVETS.
Specialties in
SHEET METAL WORK,
CLOCK and INDICATOR POINTERS,
CLARK & COWLES, Plainville, Ct.

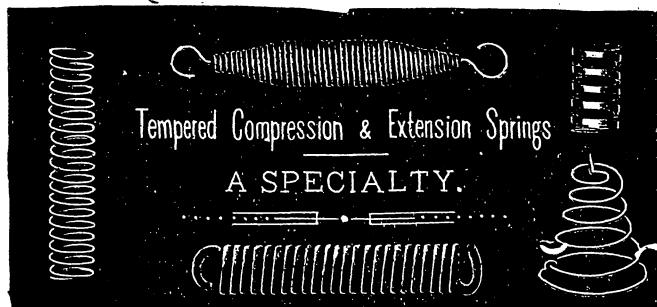
The Prospector's Field-Book and Guide in the Search for and the Easy Determination of Ores and other Useful Minerals. By Prof. H. S. OSBORN, LL.D. EXTRACT FROM THE PREFACE: In the following pages we have attempted to present such a view of the whole subject of prospecting for the useful minerals that any liberally educated reader may fully comprehend our meaning. We have therefore explained special terms where we have thought it convenient to use them, and where the technically educated student would not need an explanation. The table of contents and index have both been carefully prepared, and being very full, will make reference to any subject in the volume easy and satisfactory. 44 engravings. 775 pages \$1.50

For sale by David Williams, 96-102 Reade St., N. Y.



MILLER & VAN WINKLE,
MANUFACTURERS OF
STEEL WIRE AND STEEL SPRINGS.

TEMPERED STEEL WIRE.



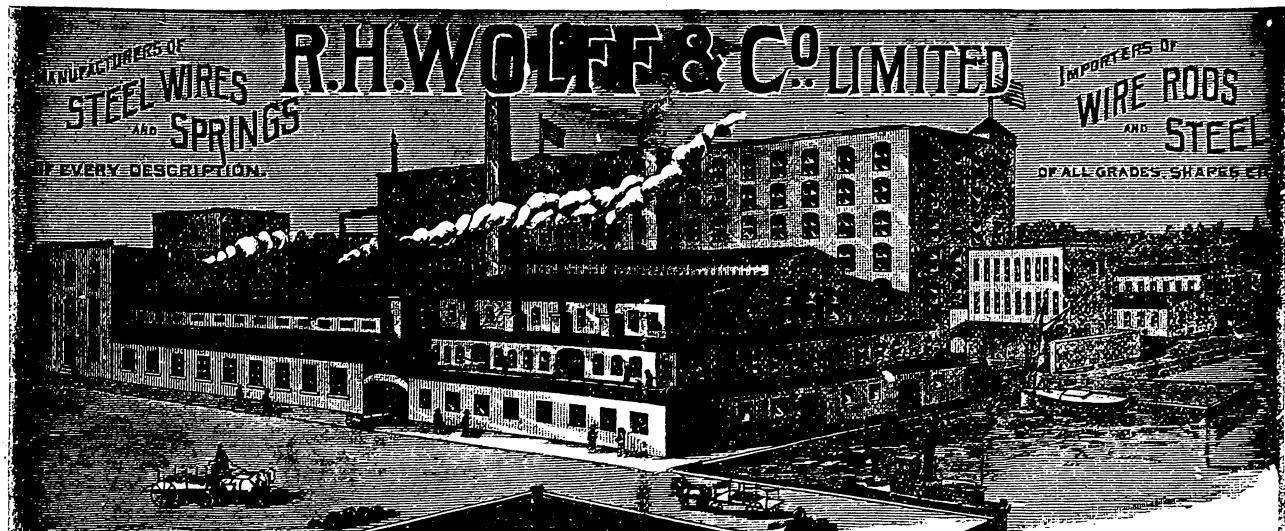
OFFICE AND WORKS: 18 to 24 Bridge Street, BROOKLYN, N. Y.



Guaranteed
Best Anti-Friction Metal for all machinery bearings. For high speed and heavy crushing weight it has no equal. It is used on bearings where no other known metal will stand.

Theo. Hierz & Son, Sole Mfrs.,
30th St. and Park Ave., St. Louis, Mo.
Mfrs. Babbitt Metals, Solder, Lead Car Seals, etc.

MACHINERY SPRINGS.



117th to 118th Street and Harlem River. General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Lock, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Piano, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Braided and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Slit soft and Tempered Steel Strips of all kinds and for all purposes.

Special Wires and Springs of Every Description.

CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

The largest coil of steel ever rolled of its dimensions, $2\frac{5}{8}$ in. wide \times 2250 FEET LONG \times .00425 in. thick.

SUPERIOR STEEL COMPANY,

PITTSBURGH, PA.,

MANUFACTURERS OF ALL DESCRIPTIONS OF

HOT and COLD ROLLED STRIP STEEL.

In widths up to 10 inches and in thickness from .0025 to 2 inches and from ordinary hot rolled soft steel to the finest cold rolled watch mainspring steel. Fine crucible steel our specialty.

Coils Furnished up to 5000 feet long according to width and gauge ordered

EASTERN REPRESENTATIVES:

Ely & Williams, 38 Park Row, New York; 1239 Market St., Philadelphia, Pa.

Wire Cloth AND Wire Goods

Hardware Grade and
Fanning Mill Wire Cloth,
Poultry Netting, Heavy
Window Screen Wire
Cloth, Coal and Sand
Screens, Riddles, Ash
Sieves, &c., &c.



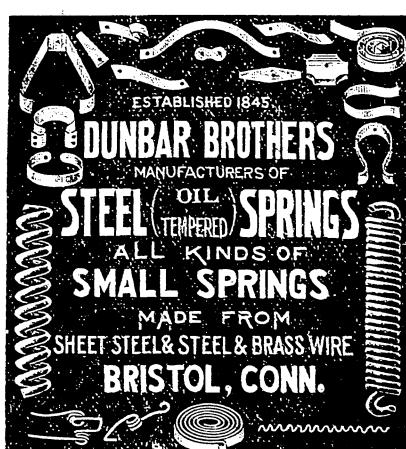
Office and Counter
Railings, Elevator En-
closures, Wire Stall
Guards, Hay Racks
Feed Boxes, Window
Guards, &c., &c.

BUFFALO, N. Y.

VOLUTE,
WIRE
and
FLAT STEEL

SPRINGS

Agricultural Implements, Machin-
ery and various other purposes.
Write for prices to
SABIN MACHINE CO.,
MANUFACTURERS.
MONTPELIER, VT.



Coal Pits and Pitmen. By R. NELSON BOYD. A short History of the Coal Trade and the Legislation Affecting It. Illustrated, 12mo, cloth.....\$1.50
For sale by DAVID WILLIAMS, 96-102 Reade St. N.Y.

**Always
Ask
For**



Unequalled for Strength
and Durability.
Made Only by
Broderick & Bascom Rope Co.,
St. Louis, Mo.

HOWSON AND HOWSON

Counsellors at Law
Solicitors of Patents

PHILADELPHIA
Forrest Building, 119 S. 4th St.
NEW YORK
Potter Building, 38 Park Row.
WASHINGTON
Atlantic Building, 928 F St.

PATENTS

U. S. and Foreign Secured.
Trade Marks and Copy Rights. Twenty Years' Experience. Send model or sketch and brief description of your invention for Free report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement. Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.
Send for "Plain Words about Patents," Free.
PATENT PRACTICE EXCLUSIVELY.
References Furnished on Application.
E. B. STOCKING, Attorney at Law,
611 F ST., N. W. WASHINGTON, D. C.

PATENTS.

H. W. T. JENNER, Patent Attorney and Mechanical Expert. 619 Seventh St., Washington, D.C. Charges moderate. Write for terms. Established 1883.

CHARLES N. BUTLER, C.E.,

ATTORNEY IN PATENT CASES,
611 Mutual Life Building, PHILADELPHIA, PA.
Tenth and Chestnut Sts.,

Formerly of the Examining Corps,
U. S. Patent Office.

W. S. ESTEY,

No. 65 FULTON ST., NEW YORK,
MANUFACTURER OF
WIRE CLOTH

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes. Locomotive Spark Wire Cloth, &c.,

— AND —

WIRE WORK

For Bank, Office and Counter Railing, Store Fronts, Window Guards, &c.

Galvanized Twist Netting.

Oliver's Patent Decoy Rat Traps.

S T Pat. Adjustable Foundry Riddles.

S T Sand Screens.

SEND FOR CATALOGUE.

COBB & DREW, PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass and Copper Rivets, Burrs, Washers, D. P. Tacks and Staples.

New York Agency, James S. Henderson, successor to Disosway & Henderson, Hardware.

Agents for Philadelphia Star Carriage and Tire Bolts.

A. LESCHEN & SONS' ROPE CO., MANUFACTURERS OF



ST. LOUIS, MO. CORRESPONDENCE INVITED.



Williamsport Wire Rope Co., Williamsport, Pa.



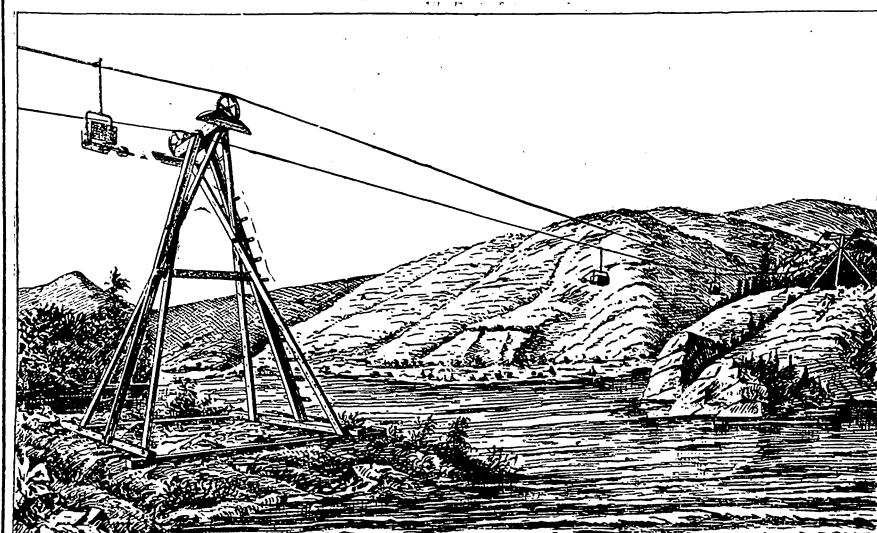
WAREROOMS: 87 Liberty St., New York. WORKS:
Wilkesbarre, Pa.

NEW HAVEN WIRE MFG. CO., WIRE in great variety.

NEW HAVEN, CONN.

Represented in New York by HENRY B. NEWHALL CO., 105 Chambers St.

CALIFORNIA WIRE WORKS, 509-511 Market St., San Francisco, Cal.



MANUFACTURERS OF

WIRE ROPE FOR CABLE RAILWAYS AND MINING PURPOSES.

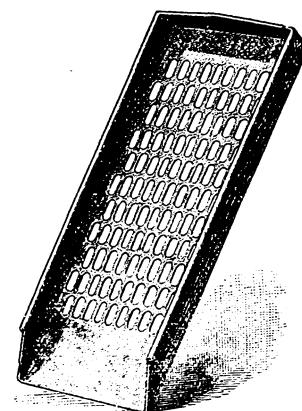
HALLIDIE'S PATENT WIRE ROPEWAY,

Simplest and most economical means of transportation. Send for Illustrated Catalogue.

HOWARD & MORSE
45 FULTON ST.,
NEW YORK.
HEAVY MINING
COPPER,
BRASS,
STEEL
OR IRON
WIRE CLOTH.

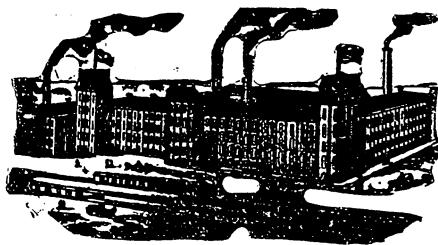
ALSO
MANUFACTURERS OF
GENERAL
WIRE WORK.
Window Guards,
Stable Fixtures,
RAILINGS,
Sand Screens
Coal Screens
Etc.

FLANGE STEEL SCREENS
OF PERFORATED METAL
For SAND, GRAVEL, COAL, and ORE.



THE HENDRICK MFG. CO., LTD.,
CARBONDALE, PA.

WICKWIRE BROTHERS, CORTLAND, N. Y.
MANUFACTURERS OF
Wire Cloth and Wire Goods,



Coal Sieves,
Flour Sieves,
Corn Poppers,
Dish Covers,
Metallic
Coal Sieves.

NEW PROCESS
Cortland
POWER LOOM
WIRE CLOTH.

Every roll wrapped in Pink Paper
and has our name on label.

Kilmer Manufacturing Co.

Newburgh, N. Y.

Manufacturers of

BALE TIES

For Baling
Hay, Straw,
Rags,
Excelsior, &c.

ALSO WIRE RODS, BARB WIRE, COILED STEEL WIRE, WIRE STAPLES, GALVANIZED WIRE, ORNAMENTAL FENCING, &c., &c.

Western Warehouse, 543 and 545 State Street, Chicago, Ill.
Western Office 21 Quincy Street, Chicago, Ill.

New York Office, 111 Water Street, New York City.
Works and General Office, Newburgh, N. Y.

STAPLES in All Varieties,
Double-Pointed Tacks, Bed Links, Etc.
New York City Agents, HARMON & DIXON,
118 Chambers Street.

Quick Shipment. Write for Prices.

BARBED
PLAIN
CABLE

WIRE NAILS
STAPLES
STRETCHERS

INDIANA WIRE FENCE CO.,

Crawfordsville, Ind.

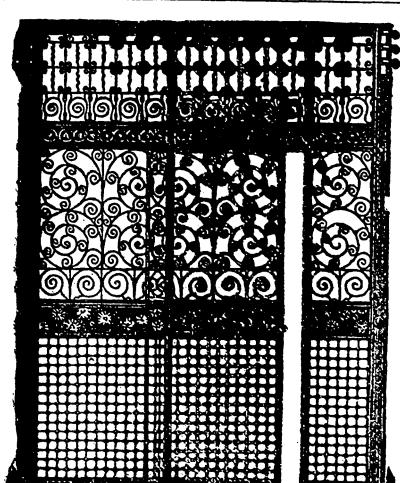
CHAMPION IRON CO.

SPECIALTIES.
Iron Stairs and Jail
Work, Builders' and Ornamental Iron Work
and the only manufacturers of Malleable Iron
Cresting guaranteed
against breakage; also
manufacturers of the
Celebrated Ohio Champion Iron Force and
Lift Pumps.

Send for 166-page Catalogue.
Largest Iron Fence and Railing Works in U. S.
KENTON. - OHIO.

SPECIAL Particular attention given to
WIRE production of goods adapted to
TACKS special lines of business. Duplicate
cating samples a specialty.

and
NAILS. **Taunton Wire Nail Co.,**
Taunton, Mass.



Elevator Enclosures.

Brass Wire and Iron Railings in plain or fancy designs.

Wire and Wrought Iron Fences and Window Guards

WRITE FOR CATALOGUE.

LUDLOW-SAYLOR WIRE CO.

114 & 116 South 4th St., St. Louis, Mo.

THE VAN DORN IRON WORKS CO., Cleveland, Ohio.



Office and Salesroom, 157½ Euclid Ave.,
MANUFACTURERS OF
WROUGHT IRON FENCE and RAILING.
Stable Fixtures, Crestings, Terminals, Wire Office and Counter Railing, Lawn Seats and Vases.

IRON and STEEL JAIL CELL WORK. ORNAMENTAL and STRUCTURAL IRONWORK.

CLINTON WIRE CLOTH CO.,

— Manufacturers of Every Description of —

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

Perforated Metals. GALVANIZERS AND TINNERS OF Wire Cloth and Nettings.

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street.

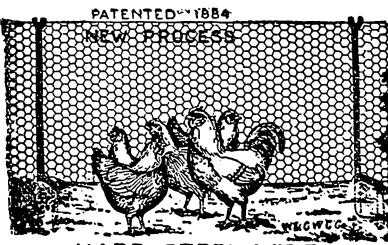
The Gilbert & Bennett Mfg. Co.

Pearl Window Screen Wire Cloth.
Galvanized Steel Wire Cloth.
Galvanized Wire Poultry Netting.
"Cottage" Lawn & Garden Fencing.
The World's Web Wire Fencing.
Sieves, Riddles, Screens.
Gilbert's Rival Ash Sifters.
House Furnishing Wire Goods

MANUFACTURE
WIRE CLOTH, NETTING,
Fencing, Gates, Fencing Tools,
Wire Goods, Wire Work
RAILINGS, WINDOW GUARDS.
WIRE LATHING WITH HAMMOND'S METAL FURRING.

44 Cliff Street,
NEW YORK.
148 Lake Street,
CHICAGO.
Factories, { GEORGETOWN, CONN.
CHICAGO, ILLINOIS.
ESTABLISHED 1818.

WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.



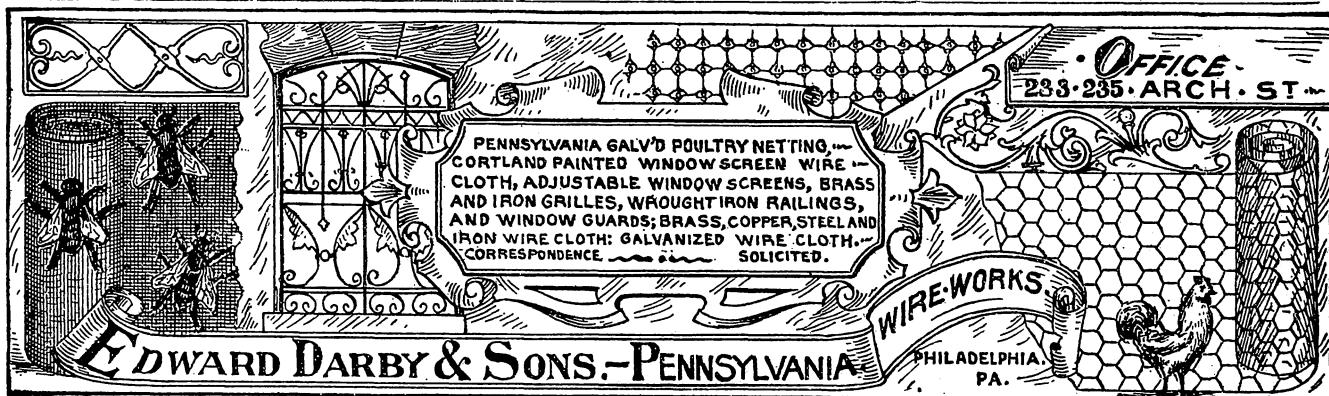
HARD STEEL WIRE

NEW PROCESS
HARD STEEL WIRE CLOTH AND NETTING
GALVANIZED
WIRE NETTING.

Patented March, 1884.
Patents Pending.

MANUFACTURERS OF EVERY DESCRIPTION OF
Painted Window Screen Wire Cloth,
WIRE LATHING, HOUSE FURNISHING WIRE GOODS.

SEND FOR LATEST CATALOGUE.



PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS
THE ROEBLING STANDARD WIRE LATHING.

TRENTON, 117 and 119 LIBERTY STREET,
NEW JERSEY.

NEW YORK.

171 and 173 LAKE STREET,
CHICAGO.

25 and 27 FREMONT STREET,
SAN FRANCISCO.

BORDEN & LOVELL,
70 AND 71 WEST STREET,
NEW YORK.

NEW JERSEY WIRE CLOTH CO.

"JERSEY"
POULTRY NETTING
AND FARM FENCING.

HERCULES WIRE. PATENTED.



Absolutely the best general purpose Fence Wire on the market to-day. Write for prices.
CLEVELAND FENCE CO., 21 Biddle St., INDIANAPOLIS, IND.

Steel, Iron and Wire Nails.

Perforated Filter
Press Plates.

THE HARRINGTON & KING PERFORATING CO. CHICAGO.

PERFORATORS OF STEEL, IRON, COPPER, ZINC, BRASS AND TIN.

GRAIN CLEANING AND MINING MACHINERY,
WOOLEN, COTTON, PAPER AND PULP MILLS,
RICE, FLOUR AND COTTON SEED OIL MILLS,
SUGAR AND MALT HOUSES,
DISTILLERIES, FILTER PRESSES,

FOR USE IN
STONE, COAL AND ORE SCREENS,
BRICK AND TILE WORKS, FILTERS,
SPARK ARRESTERS, GAS AND WATER WORKS,
OIL, GAS AND VAPOR STOVES,
COFFEE MACHINERY, ETC., ETC.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A. Eastern Office, No. 284 Pearl St., New York.

BRONZE SCREEN PLATES
To withstand action of
ACIDULATED WATERS.

GOODWIN'S

Improved Book-keeping and Business Manual,

Revised and Enlarged Edition.

BY J. H. GOODWIN.

Forty-first Thousand.

The author of this book has sought among bookkeepers of all degrees of ability and business men in various kinds of business for points which would be likely to prove of value either to a bookkeeper or to a business man. In these interviews he has been permitted to inspect the books of some of the largest business houses of the country, and to learn the methods employed by them. The work therefore embodies not only the results of his own experience, but that of at least a hundred other bookkeepers of the highest standing in the profession, from whom there have been received and are here given a great variety of valuable points.

A FEW OF THE IMPORTANT MATTERS CONSIDERED ARE AS FOLLOWS:

ADVANCED DOUBLE ENTRY. Describing the peculiarities of the most advanced systems of the present day, and contrasting them with those of antiquated systems. In this article it is shown how a set of books may be kept by Double Entry with an increase in labor of *only three per cent.* beyond that required for the keeping of them by Single Entry. The principles of Single Entry are described, and the objections to that method of keeping books set forth. Complete directions are given for the changing of a set of books from Single Entry to the most advanced system of Double Entry.

PERPETUAL PROOF. A new method of proving each and every posting, as well as the balance of every account in the Ledger—requiring but little, if any, additional labor, and effecting a saving of *fifty per cent.* in the expense of both Salaries and Ledgers.

NO TEACHER REQUIRED. Many hundreds of purchasers who had no previous knowledge of bookkeeping

have secured excellent situations through the knowledge derived from a study of this work.

STOCK COMPANIES. Explaining at length how the books for such are opened and closed; also describing in detail many other peculiarities appertaining especially to this class of business concerns.

"A 1" HOUSES. This article was written principally, from points given to the author by nineteen of the largest houses in New York City.

TRIAL BALANCES. A recently discovered method of detecting errors in Trial Balances, also a new method of detecting errors in posting.

BUSINESS MEN. This work contains a large number of valuable hints upon subjects of special interest to all business men.

Printed in two colors, on an excellent quality of paper, and is substantially bound in dark, rich cloth. Sent, post-paid, on receipt of price (\$3.00) by

DAVID WILLIAMS, PUBLISHER AND BOOKSELLER,

96-102 READE STREET, NEW YORK.

HIGHEST AWARD Received at World's Fair on
Bank and Office Railing, Wire and Iron
Fencing, Flower Vases, Cheese Safes, Station
House or Jail Cells.

E.T. BARNUM, Detroit, Mich.
Mention this paper.

THE
WIRE GOODS COMPANY,
Worcester, Mass.
Hardware and Kitchen Wire Goods. Specialties to order. Everything in Wire.

ATLAS TACK CORPORATION.**508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

DUNBAR, HOBART & CO., WHITMAN, MASS.	LORING & PARKS, PLYMOUTH, MASS.
ESTABLISHED IN 1810.	ESTABLISHED IN 1842.
A. FIELD & SONS, TAUNTON, MASS.	TAUNTON TACK CO., TAUNTON, MASS.
ESTABLISHED IN 1827.	ESTABLISHED IN 1854.

AMERICAN TACK CO., FAIRHAVEN, MASS.

ESTABLISHED IN 1867.

OLD COLONY RIVET CO., PLYMOUTH, MASS.

ESTABLISHED IN 1866.

MANUFACTURERS OF

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutcheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York Store and our factories.

MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.**BRANCH OFFICE & WAREHOUSE, 31 WARREN ST., NEW YORK.****BRANCH OFFICE & WAREHOUSE, 239 & 241 LAKE ST., CHICAGO, ILL.****BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.****BRANCH OFFICE & WAREHOUSE, 406 COMMERCE ST., PHILADELPHIA, PA.****BRANCH OFFICE & WAREHOUSE, 14 WEST GERMAN ST., BALTIMORE, MD.**

Tacks, Wire Nails and Brads, Hoop Nails, Staples, Silver and Japanned Lining and Saddle Nails, Double Pointed Tacks, Slating and Roofing Nails.

BONNIE BLUE TACKS.
100 Kegs in a Box,
Assorted 3 to 12 oz.
Retails 2 Kegs for 5 cents.

PARISIAN GILT NAILS.
20 papers in Carton.
5 cent seller.

MONARCH WOOD KEG CARPET TACKS.
5 cent seller.

BILL NYE BRAD BOX.
168 Papers Wire Brads, assorted $\frac{1}{2}$ to 2 in. Each Paper just right to retail for 5 cents.

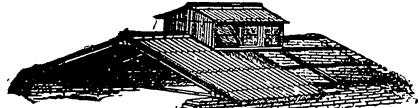
"JUST ENOUGH"
Brass Nails. 100
Nails in a Paper, just
enough to top a pair
of shoes; 20 papers in
Carton. 5 cent seller.

DOUBLE ENOUGH
Cobblers' Nails. 200
Nails in a Paper, 20
Papers in Carton. 5
cent seller.

**The New York Iron Roofing and Corrugating Co.**

Finest and Largest Variety of FIRST & WASHINGTON STS. JERSEY CITY, N.J.
Sheet Metals. Products manufactured in the U.S.

Corrugated, Crimped and Clap-Board Iron Roofing & Siding.



Iron Buildings, Roofs, Doors, Shutters, Cornices, Skylights, Bridges, &c.

MOSELEY IRON BRIDGE AND ROOF CO.
Office 5 Dey Street, Room 13. NEW YORK



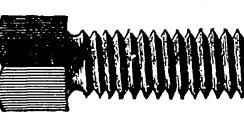
FRANKLIN S. MILES,
Manufacturer of
SCREWS,
Brass, Iron, Steel and German Silver
205 Quarry St., Philadelphia.

REYNOLDS & CO.

MANUFACTURERS OF

SET, CAP AND MACHINE SCREWS,

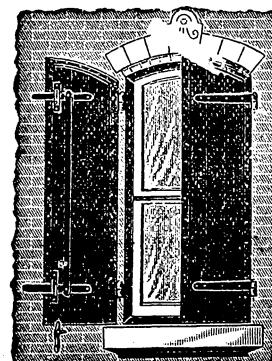
Studs, Coupling Bolts, Stove Bolts, Finished Nuts, &c.



Also Hand and Draw-plate Moulding Machines for Foundry Use.

NEW HAVEN, CONN.

SEND FOR CATALOGUE.

**PROTECT**

Your Offices, Stores and Warehouses from fire
and burglars by using

Metallic Doors and Shutters

Made from wood and covered with iron or steel, rendering them stiff and preventing warping in case of fire.
Made from heavy boiler plate iron.
Made from double corrugated iron or steel.
Made to fit any size opening.

Estimates furnished upon application.

GARRY IRON & STEEL ROOFING CO.,
CLEVELAND, OHIO.

Mention *The Iron Age*.

The Berlin Iron Bridge Co.,

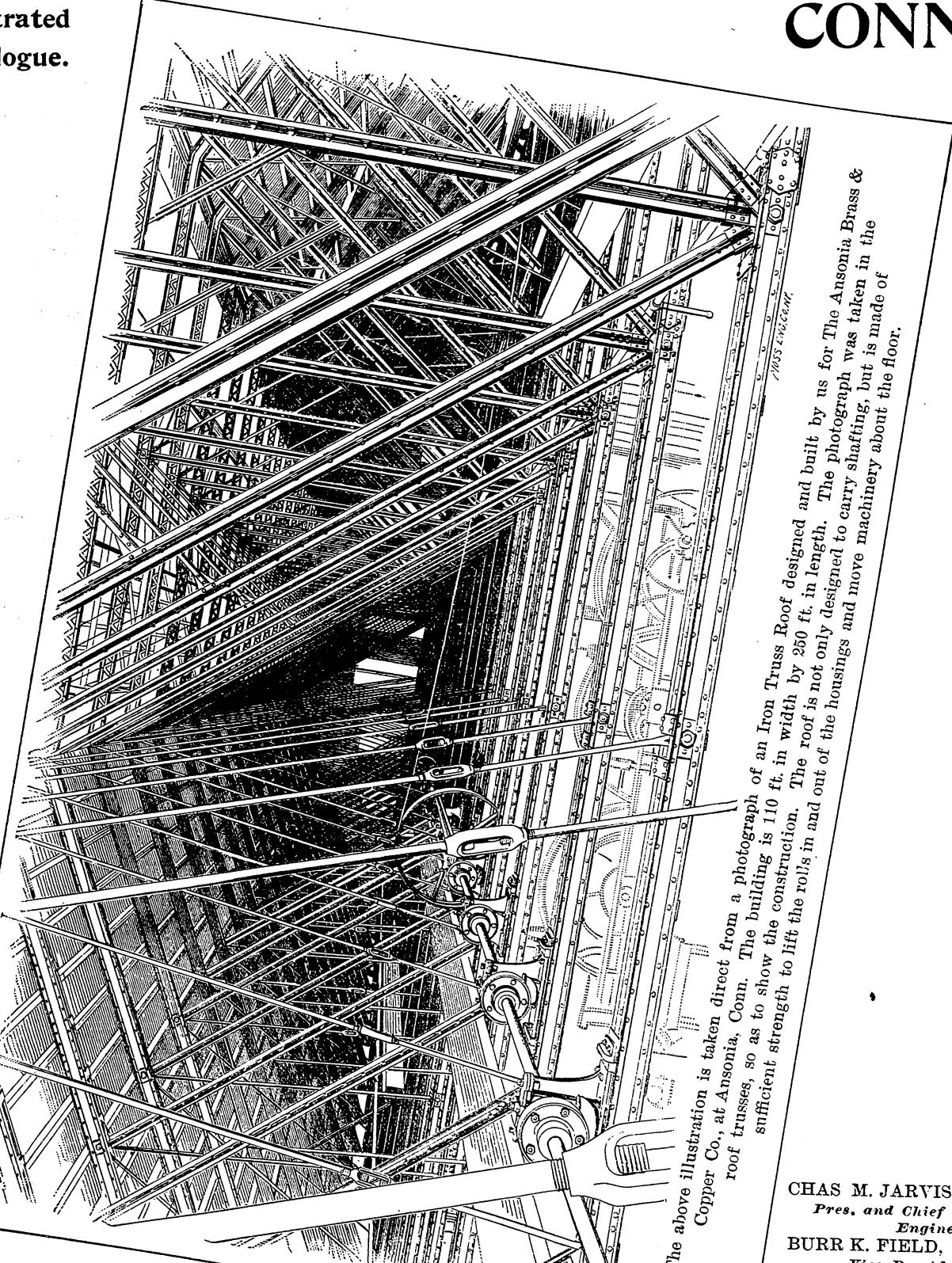
Engineers, Architects and Builders in Iron and Steel.

Office and Works,

EAST BERLIN,

CONN.

Send for
Illustrated
Catalogue.



The above illustration is taken direct from a photograph of an Iron Truss Roof of designed and built by us for The Ansonia Brass & Copper Co., at Ansonia, Conn. The building is 110 ft. in width by 250 ft. in length. The roof is not only designed to carry shafting, but is taken in the sufficient strength to lift the rolls in and out of the housings and move machinery about the floor.

CHAS M. JARVIS,
*Pres. and Chief
Engineer*
BURR K. FIELD,
Vice-President.
GEO. H. SAGE,
Secretary.
F. L. WILCOX,
Treasurer.

U. S. CENTENNIAL EXHIBITION
1876AMERICAN INSTITUTE
1841

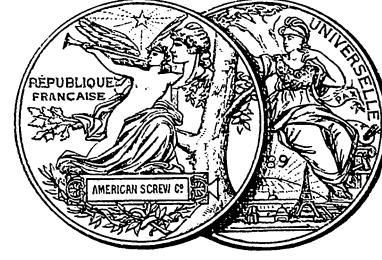
ESTABLISHED 1838.

American Screw Company,

Providence, Rhode Island,

Has Received an Award at the
**World's Columbian
Exposition**

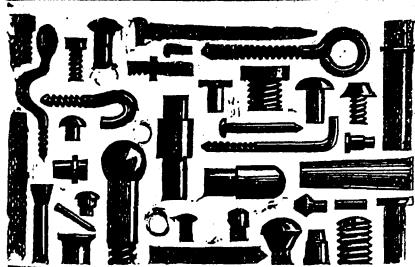
METROPOLITAN MECHANICS INSTITUTE

UTICA MECHANICS ASSOCIATION
1856AMERICAN INSTITUTE
1891FRANKLIN INSTITUTE
1856MASS. CHARITABLE MECHANIC ASS'N
1844AMERICAN INSTITUTE
1855EXPOSITION UNIVERSELLE
PARIS, 1867WORLD'S FAIR, N.Y.
1853

MIDDLESEX MECHANIC ASSOCIATION

1850

HARTFORD CO. AGRICULTURAL SOCIETY
1842FRANKLIN INSTITUTE
1842MASS. CHARITABLE MECHANIC ASS'N
1844AMERICAN INSTITUTE
1847WORCESTER CO. MECHANICS ASS'N
1849MASS. CHARITABLE MECHANIC ASS'N
1850



IRON AND BRASS RIVETS, STUDS, PINS, SCREWS, &c.,

For Manufacturers of Light Hardware.

BLAKE & JOHNSON, WATERBURY, CONN.

NEW CASTLE WIRE NAIL CO.,

MANUFACTURERS OF

STEEL WIRE NAILS.

WIRE RODS AND WIRE.

Office and Works,

NEW CASTLE, PA.



THE SALEM WIRE NAIL CO.

MANUFACTURERS

WIRE NAILS.

Works: SALEM, O.; FINDLAY, O.

General Office: - SALEM, OHIO

BRANCH OFFICES:

Room 28, 277 Broadway, New York.

415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

38 Pickering Bld'g, Cincinnati, O.

THE BOND NAIL.



These nails are made from different sizes of wire with head at any desired position between the points. For coopers, box and furniture manufacturers' dowels they are unsurpassed. Builders and repairers of all kinds will find these nails useful. We also manufacture Doweling Machines and Sets for driving these nails. Address

THE BOND NAIL CO.,

P. O. Box 23, RAYNHAM, MASS.

PHILLIPS, TOWNSEND & CO.,
North Penn Junction, Philadelphia.

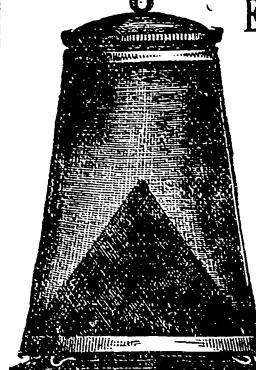
WIRE NAILS, - - - - - NORWAY RIVETS.

Rivets marked "P" are not of our make. We make only first-class NORWAY IRON RIVETS

THE "Paragon"

Increases in sales
Every year. Why? Because they are

ENDORSED



by every purchaser.

WRITE

THE

Bromwell
Brush & Wire
Goods Co.,
Cincinnati, Ohio.

We Give

Better Value

. . . IN . . .

Brass Shoe Nails,

As we carefully sift and assort them, so that all the dust and imperfect nails are removed.

Prices no Higher. Prompt Shipments.

CLENDENIN BROS., Baltimore, Md.

METAL PLATE WORK. Its Patterns and Their Geometry.

Also notes on metals and rules in mensuration for the use of tin, iron and zinc plate workers, &c.

By C. T. MILLIS. Second edition, revised and enlarged. 377 pages, 314 illustrations.

12mo, Cloth, \$3.50.

Sent, postpaid, upon receipt of price by DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

ALSITE SOLDER FOR ALUMINUM.

Does not disintegrate. The butt joint can be rolled, hammered or drawn. Full particulars on application.

ALSITE ALUMINUM CO.,
106 Liberty St., New York.

Standard Books On

METALLURGY.

A Treatise on the Metallurgy of Iron.

Containing outlines of the history of iron manufacture, methods of assay and analyses of iron ores, processes of manufacture of iron and steel, &c. By H. Bauerman, F. G. S., associate of the Royal School of Mines. Fifth edition, revised and enlarged. Illustrated with numerous wood engravings from drawings by J. B. JORDAN. 515 pages: cloth. \$2

The Metallurgy of Steel.

Volume I. By HENRY M. HOWE, A.M., S.B. mining and metallurgical engineer; illustrated with many engravings and plates 383 pages; 11 x 14 inches. \$10

Handbook for Charcoal Burners.

Translated from the Swedish of G. Svedelius by PROF. R. B. ANDERSON, and edited with notes by PROF. W. J. L. NICODEMUS, C.E.: 23 wood engravings; 217 pages; cloth. \$1.50

The Metallic Alloys.

A practical guide for the manufacture of all kinds of alloys, amalgams and solders, used by metal workers; together with their chemical and physical properties and their application in the arts and the industries: with an appendix on the coloring of alloys. Translated and edited chiefly from the German of A. KRUPP and ANDREAS WILDEBERGER, with extensive additions by WM. T. BRANNET; illustrated by 16 engravings; 426 pages; cloth. \$3.00

The Metal Worker's Handy Book of Receipts and Processes.

Being a collection of chemical formulas and practical manipulations for the working of all the metals and alloys, including the decoration and beautifying of the articles manufactured therefrom, as well as their preservation. Edited from various sources by WILLIAM T. BRANNET. 530 pages; cloth. \$2.50

Steel and Iron.

Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mills, the forge and the foundry. By WILLIAM HENRY GREENWOOD, F.C.S. With 97 diagrams; 530 pages; cloth. \$2

An Introduction to the Study of Metallurgy.

By W. C. ROBERTS-AUSTEN, C. B., F. R. S., Associate of the Royal School of Mines, Chemist and Assayer of the Royal Mint, Professor of Metallurgy in the Royal College of Science, with which the Royal School of Mines is incorporated. CONTENTS: Physical properties of metals; alloys; the thermal treatment of metals; fuel; materials and products of metallurgical processes; furnaces; means of supplying air to furnaces; typical metallurgical processes; economic considerations. With numerous diagrams, 292 pages, cloth. \$2.50

Sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller.

96-102 Reade St. New York.

Gautier Steel Department of Cambria Iron Co.,

JOHNSTOWN, PA.

— MANUFACTURERS OF —

MERCHANT BAR STEEL:

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.

AGRICULTURAL STEEL AND SHAPES:

Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.

PLOW STEEL:

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, etc.

COLD ROLLED STEEL SHAFTING.

STEEL HARROW DISCS.

CAMBRIA LINK BARB WIRE.

New York Office,
102 Chambers St.

Philadelphia Office,
S. W. Cor. 5th & Commerce Sts.

Chicago Office,
209 Phenix Building.

Southern Office,
Chattanooga, Tenn.

The Cincinnati Corrugating Co.,

We are the largest manufacturers of Iron and Steel Roofing in the country, and are prepared to ship on short notice, and at the lowest prices. We want enterprising agents of good standing, in each county, and solicit correspondence.

Our little book, "The Life of an Iron Roof, or how long will it last," sent free.

Send for Illustrated Catalogue.

Office and Works, Piqua, O.

• STEEL ROOFING •
• CORRUGATED IRON • EAVE TROUGH •
CONDUCTOR PIPE • ROOF PAINTS • ETC.
CORRESPONDENCE SOLICITED THE CAMBRIDGE ROOFING CO. CAMBRIDGE, OHIO.

THE KANNEBERG ROOFING CO. CANTON, O.
MFR'S OF ORIGINATORS OF GENUINE STEEL ROOFING.
THE KANNEBERG PAT. LATEST IMPROVED FOLDED LOCK SEAM, ALSO CORRUGATED & CRIMPED IRON ROOFING SIDING & CEILING EAVE-TROUGH.
STEEL ROOFING. CONDUCTOR PIPE &c.
WRITE FOR CATALOGUE & PRICE LIST

THE CELEBRATED
"SILVER FINISH"
GALVANIZED POULTRY NETTINGS.
FOR SALE BY THE HARDWARE TRADE.

GET THE BEST

Lukens Iron AND Steel Co. INCORPORATED 1890.
 The First to make Boiler Plates in America.
 Chas. Huston, Pres. A. F. Huston, Vice-Pres. C. L. Huston, Genl. Mgr. Robt. B. Haines, Jr., Secy. Jos. Humpton, Treas.
STEEL AND IRON PLATES, ALSO SHEETS
 TO EXTREME DIMENSIONS. WIDTHS UP TO 10 FEET. THICKNESS, NO. 12 GAUGE TO 1½ INCHES.
 WORKS: ESTABLISHED 1810.— NEW YORK OFFICE: PHILADELPHIA OFFICE:
 Coatesville, Pa. No. 29 Broadway. 62 & 64 Bullitt Bldg.

FRANK SAMUEL,
 136-138 So. 4th St.,
 Philadelphia.

LOW PHOSPHORUS

PIC IRON—.03 or under.
 SCRAP—.03 or .05 or under.
 ORE—For O. H. and Furnace Use.
 MELTING BAR—
 Open Hearth and Bessemer Billets,
 Skelp, Muck Bars and Scrap, Foundry
 and Bessemer Pig Iron.
 Syracuse Tube Co.'s Tubes and Pipe.

THE PHÆNIX IRON CO., 410 Walnut St., Philadelphia,

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

WROUGHT IRON AND OPEN HEARTH STEEL.

Beams. Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.
 SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes, Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS.; JAMES B. STOKES, 123 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. STITES, 931 The Rookery, CHICAGO.

POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.,

PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

TESTED CHAINS.

BRADLEE & CO., - EMPIRE CHAIN WORKS,

Beach and Otis Streets, PHILADELPHIA.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging, Slope and Mining Chains. Ship's Cables and Marine Railway Chains.

S. T. WELLMAN, President.
 S. H. CHAUVENET, Vice-President.

J. H. ROOP, Treasurer.
 RICHARD PETERS, Jr., Secretary.

C. H. WELLMAN, Superintendent

BARCLAY W. COTTON & CO.,
 Successors to ESHERICK, COTTON & CO..

Iron and Steel Merchants.

AGENTS FOR

AMERICAN WIRE GLASS MFG. CO.
 418 Walnut St., PHILA.

MIFFLIN WHEELER. G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,

216 South Third St., Philadelphia, Pa.

—DEALERS IN—

IRON AND STEEL SCRAP.

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.,
 Steel and Iron Plates, New and Old Rails.

WELLMAN IRON AND STEEL CO.

MANUFACTURERS OF

Highest Grade Open Hearth Low Phosphorus Steel Fire Box and Boiler Plate. Bessemer Steel Ship and Tank Plate. Open Hearth and Bessemer Blooms and Slabs.

Low Phosphorus Pig Iron.

PLATES UP TO 126 INCHES IN WIDTH.

General Office and Works, Thurlow, Delaware County, Pa.

Chicago, Ills., No. 656 "The Rookery."

E. W. CRAMER, Agent.

New York, N. Y., No. 7 Nassau Street,

J. H. BELCHER, Agent.

BARCLAY W. COTTON & CO.,
 Successors to ESHERICK, COTTON & CO..

Iron and Steel Merchants.

AGENTS FOR

AMERICAN WIRE GLASS MFG. CO.
 418 Walnut St., PHILA.

MIFFLIN WHEELER. G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,

216 South Third St., Philadelphia, Pa.

—DEALERS IN—

IRON AND STEEL SCRAP.

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.,
 Steel and Iron Plates, New and Old Rails.

EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS.

BEAMS, CHANNELS,
 ANGLES, TEES, PLATES,
 RIVETED GIRDERS.

IRON AND STEEL,

421 CHESTNUT ST.,

PHILADELPHIA.

29 BROADWAY,
 NEW YORK.

OUR OFFICES AND MILLS ARE CONNECTED BY TELEPHONES.

BARS, BANDS, HOOPS,
 BOLTS, NUTS, RIVETS,
 ROOF TRUSSES.

70 KILBY ST.,
 BOSTON.

EDWARD J. ETTING,
IRON BROKER & COMMISSION MERCHANT
222 S. THIRD ST., PHILADELPHIA, PA.
Pig, Bar and Railroad Iron, Old Rails, Scrap.
AGENT FOR THE
MOUNT SAVAGE FIRE BRICK.
Eastern Penna., West New Jersey and Delaware.
AGENT TRENTON IRON CO.
For the Sale of Wire and Wire Rope.
Longdale (Va.) and other Pig Irons.
STORAGE YARD, Pier No. 57 South (old Navy Yard)
which is connected with Penn. R. R. and its various
connections. Negotiable Warehouse Receipts issued
CASH ADVANCES MADE ON IRON.

ESTABLISHED 1860.
JEROME KEELEY & CO.,
The Philadelphia Bank Bldg., 421 Chestnut St.,
PHILADELPHIA.
Foundry & Forge Pig Irons,
Iron Ores, Coke, Coal,
Steel Blooms, Billets, Rails, etc.
Muck Bars, Blooms, Scrap Iron.
Consulting Engineers in Metallurgy and Mining.

JUSTICE COX, JR.,
218 South 4th St., Phila., Pa.
IRON and STEEL.
— AGENT FOR —
Haldeman, Grubb & Co's.
Chickies Bessemer Pig Iron.
Mahoning Rolling Mill Co.'s
Best Quality Skelp Iron and Steel.
Pulaski Iron Co.'s
High Grade Foundry and Forge Pig Iron.
Hainsworth Steel Co.'s
Standard Bessemer Steel Billets.
Bars, Angles, Sheets, Tank and Bridge
Plates, Muck Bars, Blooms, Scrap Iron
and Tool Steel.

J. W. HOFFMAN & CO.,
Bullitt Building, 135 So. 4th St., Philad'a.,
Iron and Steel Merchants.
PIG IRON,
Iron and Steel Plates, Sheets, Bars and Shapes. Rails
Cars and Locomotives. Track Equipment.
CORRESPONDENCE SOLICITED.

JOHN L. HOGAN & CO.,
IRON COMMISSION MERCHANTS,
Bullitt Building, 135 South Fourth St., Phila.
Agents for Brier Hill, Lehigh, Struthers
AND MUIRKIRK PIG IRON,
Delaware Rolling Mill, muck bars, Youngstown Steel
Co., Connellsville Coke.

W. H. THOMSON & CO.,
Dealers in
IRON and STEEL and
other METALS
FOR ALL PURPOSES,
Room 259, Bullitt Building,
PHILADELPHIA, PA.

B. Houston. J. Max Bernard. H. H. Houston
C. B. HOUSTON & CO.,
Bullitt Building.
Pig Iron, Coal, Coke, Steel Rails, Structural
Iron, Steel Castings and Fire Brick.
Sole Agents for PAXTON ROLLING MILLS.
STEEL AND IRON PLATES

FRANCIS WISTER
COMMISSION MERCHANT,
Coke, Coal, Ores.
PEA AND BUCKWHEAT (Red and White Ash).
National Foundry Coke a Specialty. Sulphur less
than 0.5.
All Sizes National Crushed Coke.
420 Walnut Street, PHILADELPHIA.

W. S. PILLING.

T. I. CRANE

PILLING AND CRANE.

IRON ORES: Lake Superior, Foreign, Concentrates,
Magnetic and native Self-fluxing.
PIG IRON: Low Phosphorus, Open-hearth, Bessemer
and other grades.
STEEL: In Blooms, Slabs and Billets, and scrap.
COKE: For Furnace and Foundry use.

BULLITT BUILDING, 141 S. FOURTH ST., PHILADELPHIA.

ALAN WOOD COMPANY,

MANUFACTURERS OF

Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,
PLATE & SHEET IRON.

ALSO LIGHT PLATES AND SHEETS OF STEEL.

No. 519 Arch Street, Philadelphia, Pa.

Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack,
Tank and Boat Iron: Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

CUMBERLAND NAIL AND IRON CO.,

MANUFACTURERS OF

"Cumberland" Nails & Wrought Iron Pipe,
43 North Water St., and 44 North Delaware Ave., PHILADELPHIA.

J. J. MOHR,

Bullitt Building, No. 131 South Fourth St., Philadelphia, Pa.

— SOLE AGENT FOR —

Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-
DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.
Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

JAMES G. LINDSAY & CO.

BULLITT BUILDING, 133 South Fourth St., PHILA.

IRON and STEEL STRUCTURAL MATERIAL

For all purposes. Estimates furnished for Iron and Steel Structures.

High Grade Tested Chains.

JAMES MCKAY & CO.,
29TH & LIBERTY STREETS, PITTSBURGH, PA.

Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade
Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

FITZSIMONS & CO.,

— MANUFACTURERS —

COLD DRAWN**SHAFTING****IRON STEEL**

CLEVELAND, OHIO.

WEST'S MOULDERS' TEXT BOOK

BEING PART II. OF AMERICAN FOUNDRY-PRACTICE,

Giving the best methods and rules for obtaining good castings, with detailed
description for making moulds. A thoroughly practical book
that should be in the hands of every moulder.

PRICE, - Cloth, - 460 Pages, - - - \$2.50.

SENT, POST-PAID, ON RECEIPT OF PRICE BY

DAVID WILLIAMS, Publisher and Bookseller,

96-102 Reade Street,

New York City.

FRANCIS HOBSON, SEAMAN & CO.,

Successors to FRANCIS HOBSON & SON,
DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

HOBSON'S "CHOICE" **XX** Extra Best and "Warranted Best"
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire.

SEAMAN'S "NELSON" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

THOS. FIRTH & SONS, LIMITED, SHEFFIELD. CRUCIBLE CAST STEEL.

ABBOTT, WHEELOCK & CO., Agents and Importers of
SWEDISH IRON,

35 OLIVER ST., BOSTON.

23 CLIFF ST., NEW YORK.

S. & C. WARDLOW, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch and all other Springs; also Sole Makers of the Special Brand "**TOUGH**" Cast Steel for Leather Splitting and Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St., New York. Frank S. Pilditch, Agent.

GUSTAF LUNDBERG,

Agent for N. M. HOGLUND'S SONS & CO. of Stockholm.

Swedish and Norway Iron.

Bessemer and Open Hearth Steel.

19 KILBY STREET, BOSTON.

CARLISLE KAYSER, ELLISON & CO., SHEFFIELD,
WORKS, ENGLAND

Late WILSON HAWKSWORTH, ELLISON & CO..

(ESTABLISHED 1825.)

CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents.

31 OLIVER STREET, BOSTON.

93 LIBERTY STREET, NEW YORK.

JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Corset Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

JESSOP'S STEEL

MANUFACTURED BY

WM. JESSOP & SONS, L'D.

OF Best Quality,
IN Bars, Sheets AND Plates.

Large assortment of sizes in stock at
91 John St., NEW YORK,
And other Agencies.

SHEFFIELD,
ENGLAND.

Gold Medal Paris,
1889.

"F. W. MOSS" SHEFFIELD STEEL & FILES

For further particulars apply

to

NEWTON &

SHIPMAN.

83 John St., New York.

Prices for Direct Importation in Wholesale Quantities From Sheffield.	
Improved Mild Centered Cast Steel for Taps, Reamers, &c	@ £59 Per ton in Sheffield
Warranted Extra Cast Steel for Taps, Dies, Milling Tools, &c.	50 "
Warranted Cast Steel for tools, Taps, Dies, Turning Tools, &c.	44. 10/ " " "
Best Crucible Machinery Steel	30 " " "
Best C. S. EXTRA WEIGHT HAND CUT FILES	@ 50/- & 4% cash discount "
No charge for extra sizes when steel is ordered in wholesale quantities of assorted sizes.	

CAMBRIA STEEL,

Steel Rails, STANDARD AND LIGHT WEIGHTS, Street Rails and Railway Fastenings,
BESSEMER AND OPEN-HEARTH BLOOMS, BILLETS AND BARS.
Steel Axles, Steel Angles, Steel Channels, Steel Forgings.

CAMBRIA IRON COMPANY, Office, 218 S. Fourth St., Philadelphia.
 Chicago Office, Phoenix Building.
 (WORKS AT JOHNSTOWN, PA.)

A. & P. ROBERTS & COMPANY,

Pencoyd Iron Works,

MANUFACTURERS OF

Wrought Iron and Open Hearth Steel,

OFFICE: 261 S. 4th Street, PHILADELPHIA, Pa.

E. H. Wilson. A. Kaiser. J. B. M. Hiron.
 E. H. WILSON & CO.,
 222 and 224 South Third St., Philadelphia
 BROKERS AND DEALERS IN
IRON AND STEEL.

Correspondence solicited.

PIERSON & CO.,
 DEALERS IN
IRON and STEEL
 OF EVERY DESCRIPTION,
 29 Broadway, cor. Morris St.,
 NEW YORK.

A. R. WHITNEY & CO.,
 MANUFACTURERS AND DEALERS IN
IRON and STEEL.
 AGENCIES:
 CARNEGIE STEEL CO., Limited, Structural Material, Steel and Iron Columns, Beams, Channels, Shapes and Plates. Steel Beams Rolled to 24 inches deep.
 PORTAGE IRON CO., Limited, Merchant Iron, Bars, Angles, Hoops and Cotton Ties.
 BROOKLYN WIRE NAIL CO., Steel Wire Nails. Export Nails a Specialty.
 RIVERSIDE IRON WORKS, Steel Pipe.
 GLASGOW TUBE WORKS, Boiler Flues.
 AMERICAN WIRE NAIL MACHINES. Over 900 working satisfactorily in the United States, 25 in Europe and 100 in Canada.
 THE SEIDELL & HASTINGS CO., Charcoal-Iron Boiler Plates.
 Plans and estimates furnished and contracts made for Iron and Steel Structures of every description. Please address,
 29 Broadway, New York.
 P. O. Box 23.

NORTH BROTHERS MFG. CO.
 Iron and Brass Founders,
 Light Castings a Specialty.
 N. W. Cor. 23d and Race Streets.
 PHILADELPHIA.
 Correspondence solicited.

AMERICAN-
 PIC IRON STORAGE WARRANT CO.,
 (Bank of America Building,) 44 Wall St., N. Y.
 Correspondence of Furnaces Invited.



Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability.

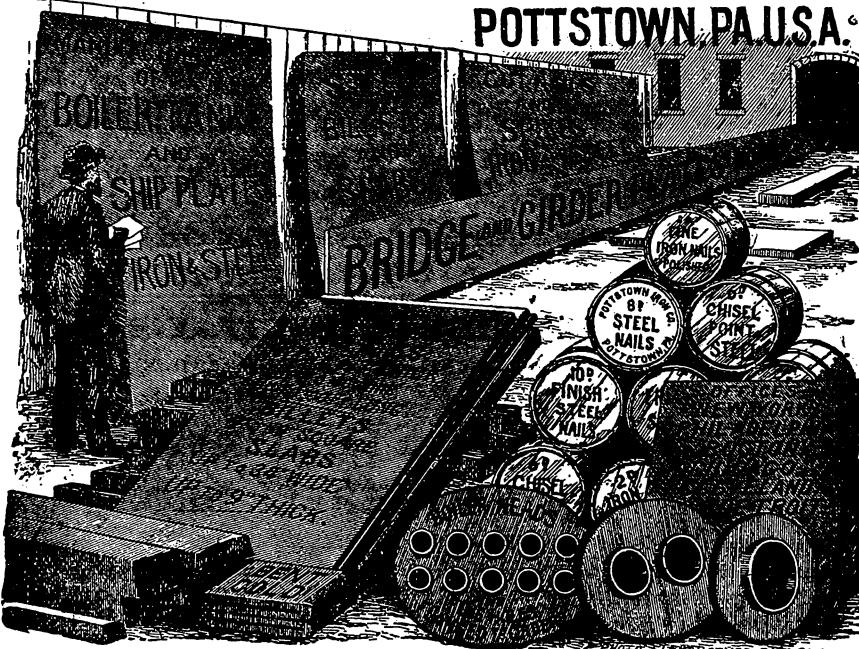
CHROME STEEL WORKS,
 Brooklyn, N. Y.

Pencoyd Bridge & Construction Co.,
 DESIGNERS AND MANUFACTURERS OF
 Bridges, Viaducts, Turn Tables, Etc.
 WORKS, PENCLOYD, PA.

A. MILNE & CO.,
Swedish (Norway) Iron and Steel,
 BLOOMS, BILLETS, BARS; WIRE, RIVET AND NAIL RODS.
FOREIGN AND DOMESTIC IRON AND STEEL.
 1 Broadway, New York. 8 Oliver Street, Boston.

POTTSTOWN IRON CO.

POTTSTOWN PA U.S.A.



FRANKFORD STEEL COMPANY.
 FRANKFORD, PHILA., PA.
Steel Railroad and Machine Forgings,
 SOLID CRUCIBLE STEEL CASTINGS
 AND
 Best Grades of Tool and Machinery Steel.

CRESCE
NT STEE
L
480 PEARL ST.
NEW YORK
PITTSBURGH, PA.
64 & 66 S. CLINTON ST.
CHICAGO.

AETNA-STANDARD IRON AND STEEL CO.,Successors to **Aetna Iron and Steel Co., and The Standard Iron Co.,** Manufacturers of

PLATES and SHEETS, BLACK, GALVANIZED and CORRUGATED Plain Roofing, Siding and Ceiling, also of Sheet Steel, for special purposes, Cold Rolled or Plain and Patent Leveled.

BARS, LIGHT SECTION RAILS, ANGLES, TEES and CHANNELS, odd sections and sizes, Machine Straightened Steel Tire, Ordinary Shafting, Horse-Shoe Bars, Ax-Poll Steel, Toe Calk, Nut, Bolt and Chain Rods, and other special Bars suited to every requirement.

PROMPT SHIPMENT from STOCK.

Inquiries solicited. Stock List Mailed on Application. Address, BRIDGEPORT, OHIO.

CARBON STEEL COMPANY, PITTSBURGH, PA.

MANUFACTURERS OF-

Universal Mill Plates.
Sheared Plates and
Sheets.

LIST OF SIZES SENT UPON APPLICATION.

AGENCIES:

L. S. BOOMER, 647 The Rookery, Chicago, Ill.
GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O.
BULLARD & POST, 125 Milk Street, Boston, Mass.THE CONDIT-FULLER CO., Perry-Payne Building, Cleveland, O.
JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.
GEO. C. BEALS, Erie Co. Savings Bank Building, Buffalo, N. Y.

R. MUSHET'S
"SPECIAL," **STEEL** **"TITANIC,"**
FOR CHISELS, TAPS, DIES, CHILLED ROLL
LATHE AND PLANER TOOLS.
(The "Trade-Marks" of which are registered in the United States.)
MANUFACTURED ONLY BY
SAMUEL OSBORN & CO., - Clyde Steel & Iron Works, Sheffield, Eng.
SOLE REPRESENTATIVES IN THE UNITED STATES,
B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.
No. 143 LIBERTY STREET, NEW YORK.

THE IRON FOUNDER,
A COMPREHENSIVE TREATISE ON
The Art of Molding.INCLUDING CHAPTERS ON
Core-making; Loam, Dry Sand and
Green Sand Molding; also Crystallization,
Shrinkage and Contraction of Cast
Iron, and a full explanation of the science
of Pressures in Molds; added to which
are Formulas for Mixtures of Iron, Tables
Rules and Miscellaneous Information.BY
SIMPSON BOLLAND;
Practical Molder and Manager of Foundries.
Illustrated with Over Three Hundred Engravings.
12mo. Cloth, \$2.50.

"The Iron Founder" Supplement.
A Complete Illustrated Exposition of
THE ART OF
CASTING IN IRON,
COMPRISING THE

Erection and Management of Cupolas, Reverberatory Furnaces, Blowers, Dams, Ladles, Etc.; Mixing Cast Iron; Founding of Chilled Car Wheels; Malleable Iron Castings; Foundry Equipments and Appliances; Gear Molding Machines; Molding Machines; Burning, Chilling, Softening; Annealing; Pouring and Feeding; Foundry Materials; Advanced Molding; Measurement of Castings; Wrought Iron, Steel, Etc.; also the Founding of Statues; the Art of Taking Casts; Pattern Modeling; Useful Formulas and Tables.

BY
SIMPSON BOLLAND,
Practical Molder and Manager of Foundries; Author of "The Iron Founder," etc.Illustrated with over Two Hundred Engravings.
400 Pages. 12mo, cloth, \$2.50.Sent, post-paid, on receipt of price by
DAVID WILLIAMS, Publisher & Bookseller,
96-102 Reade St., New York.

STEEL PIPE STEEL NAILS
RIVERSIDE IRON WORKS
MANUFACTURERS
STEEL
PIPE AND NAILS
WHEELING, WEST VA.
THE RIVERSIDE IRON & STEEL CO.

THE CAMBRIDGE IRON & STEEL CO.
MANUFACTURERS OF
GALVANIZED SHEET IRON
BLACK SHEETS
FOR ROOFING & CORRUGATING
CAPACITY RANGES FROM NO. 30
26 INCHES WIDE TO 14x40-120
CORRESPONDENCE
SOLICITED OFFICE & WORKS CAMBRIDGE, OHIO.

ESTABLISHED IN 1848. SINGER, NIMICK & CO., Ltd. PITTSBURGH, PA.

MANUFACTURERS OF ALL KINDS OF

Hammered and Rolled

STEEL.

Warranted Equal to any Produced.



HIGH GRADE SPECIAL Crucible Tool Cast Steel, for all purposes requiring the very finest quality.

SINGER'S ANNEALED EXTRA Crucible Tool Cast Steel, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an extra fine quality.

BEST Crucible Tool Cast Steel, for all purposes requiring steel of Standard quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.

SAW STEEL, for Circular, Muley, Mill, Gang, Drag, Pit and Cross-Cut Saws.

HOT ROLLED SHEET STEEL, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.

BRIGHT COLD ROLLED SHEET and **STRIP STEEL**, for Cold Drawing, Stamping and Bending; for Bells, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequaled finish and accuracy of gauge.

ROUND MACHINERY STEEL. for Shafting, Rollers, Spindles, &c., &c.

"Iron Centre" Cast Plow Steel.

"Soft Steel Centre" Cast Plow Steel.

"Soft Steel Back" Cast Plow Steel.

"Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.

Crucible Cast Plow Steel.

Steel Rotary Harrow Discs.

Finished Rolling Plow Colters.

Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at 243 Pearl and 18 Cliff Streets, NEW YORK, by

HOCAN & SON, General Agents for Eastern and New England States.

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA & CO., 110 North St., Boston, and

W. E. STOCKTON, 16 & 18 West Lake St., Chicago.

HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

LA BELLE STEEL CO.

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa.

MANUFACTURERS OF ALL KINDS OF STEEL SPRINGS, AXLES, RAKE TEETH, Etc.

WETHERELL BROS., EASTERN REPRESENTATIVES, 31 Oliver St., Boston, and 93 Liberty St. N.Y.

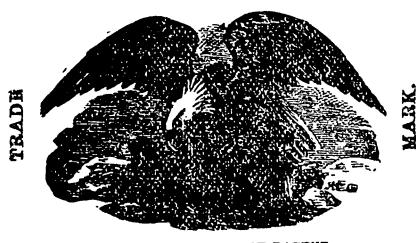
Canadian Agent, W. G. BLYTH, No. 76 York St., Toronto, Ont.

J. TATNALL LEA & CO..

No. 125 So. Fourth St., Philadelphia.

**BESSEMER, MILL AND FOUNDRY PIG IRON,
MUCK BARS AND IRON ORES.**

W. Dewees Wood Co.,



MANUFACTURERS OF PATENT

PLANISHED SHEET IRON.

PATENTS :

Dec. 10th, 1878. Mar. 4th, 1884. Aug. 31st, 1886.
Jan. 10th, 1882. April 15th, 1884. Jan. 1st, 1889.
Jan. 1st, 1884. June 10th, 1884. Jan. 17th, 1893.
Feb. 12th, 1884. Jan. 6th, 1886.

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

Wood's Smooth Finished Sheet Irons and Sheet Steel, Cleaned and Free from Dust.

GENERAL OFFICES AND WORKS

MCKEESPORT, PA.

Branch Office : 111 Water Street, Pittsburgh, Pa.

Screws and Screw Making With a Chapter on the Milling Machine; a complete treatise on Screw Making in all its branches, embracing most recent methods and containing the reports which originated modern standard screw threads. With 95 illustrations. 12mo, cloth.....\$1.25

For Sale by David Williams, 96-102 Reade St., N.Y.

— SOHO IRON & STEEL WORKS —

MOORHEAD & MC CLEANE CO.
MANUFACTURERS OF
PLATE IRON & STEEL.
GALVANIZED 
PLATES (SPECIAL WIDE AND EXTRA LONG)
SHEETS (AND EXTRAS)
IRON (CORRUGATED & ROOFING, CORRUGATED & CURVED, CURVED & ROOFING, CEILING IRONS)

OFFICES AND WORKS,
PITTSBURGH.
EASTERN WAREHOUSE.
No. 81 JOHN STREET,
NEW YORK.
WESTERN WAREHOUSE.
Nos. 16 & 18 W. LAKE ST.
CHICAGO.

Stay-Bolt,
Rivet, D. Link,
Axe, Hatchet,
Carriage and
Wagon Axle

IRON.

Superior Quality Refined Bar Iron
"VULCAN" AND "LOCKHART" BRANDS.



SMALL CHANNELS AND ANGLES,
HEXA CON IRON AND STEEL.

All Merchant Bar Sizes of Soft STEEL.

**THE
BETHLEHEM
IRON COMPANY.**

SOUTH BETHLEHEM, PENNA.

**STEEL RAILS,
BILLETS AND MUCK BAR,**

STEEL FORGINGS.

HOLLOW SHAFTING, CRANKS, ROLLS, GUNS AND ARMOR.
Rough, Machined or Finished, Fluid Compressed, Hydraulic Forged.

**NEW YORK OFFICE, - - - 80 BROADWAY.
PHILADELPHIA OFFICE, - - - 421 CHESTNUT ST.**

THE S. OBERMAYER CO.,

Cincinnati, O., and Chicago, Ills.

— MANUFACTURERS OF —

FOUNDRY FACINGS, SUPPLIES and EQUIPMENTS

— IMPORTERS AND REFINERS OF —

East India Plumbago, Black Lead and Graphite.

Brass and Iron and Steel Foundries completely equipped.

General Catalogue sent on Application.

PASSAIC ROLLING MILL CO., Paterson, N. J.

— MANUFACTURE —

ROLLED STEEL or IRON BEAMS

Channels, Angles, Tees, Bars, Riveted Work, Fergings, Eye Bars, &c., &c.,

Also OPEN HEARTH STEEL BILLETS and SLABS.

NEW YORK OFFICE, — Rooms 151 and 152, No. 45 Broadway.

THE MONTOUR IRON & STEEL COMPANY,

DANVILLE, PA.



PIG IRON, T AND STREET RAILS,

Light Rails, 12 to 40 lbs. per yard.

RAIL JOINTS, SPIKES AND BAR IRON.

— ESTABLISHED 1850. —

ARCADE MALLEABLE IRON CO.
WARREN McFARLAND & CO.

Malleable Iron and Steel Castings,
WORCESTER, MASS.

Correspondence solicited. Prices given upon receipt of patterns or samples.

GEO. B. BUCKINGHAM.

THE GARTLAND FOUNDRY CO.,

— MANUFACTURERS OF —

Light Work our Specialty. **Soft Grey Iron Castings.** We are prepared to do Japanning and Galvanizing.

UNION and ECHO STS.,
Cleveland, Canton & Southern R. R.,

CLEVELAND, O.

STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO.

— HEADQUARTERS FOR —

LIGHT GRAY IRON CASTINGS.

— UNEQUALLED IN —

SOFTNESS and SUPERIOR FINISH.

Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can please you. Send samples for prices.

"CATASAUQUA"

HIGH GRADE

Bars.

CATASAUQUA MFG. CO.

Charles K. Barns & Co., Agents,
224 South Fourth St., PHILADELPHIA.

L. & R. WISTER & CO.,
257 So. 4th St., Philadelphia.

Dunbar Foundry and Forge Irons.
Kemble Pig Iron.
Tuscarawas (Black Band).
Warner & Co's Wash Irons.

Dealers in all kinds of Scrap Iron and Steel.

HENRY LEVIS & CO.,
Manufacturers' Agents

For Iron and Steel Rails, Car Wheels, Boiler and Sheet Iron and General Railway Equipments.
Old Rails, Axles and Wheels bought and sold.
234 S. 4th St., Philadelphia.

Manhattan Rolling Mill.

JOHN LEONARD,
446 to 452 West St., New York.

MANUFACTURER OF

HORSE SHOE AND BAR IRON
BLACKSMITH SUPPLIES.

OGDEN & WALLACE,
85, 87, 89 & 91 Elm St., New York.

IRON AND STEEL
Of every description kept in stock.
Agents for Park, Brother & Co.'s
BLACK DIAMOND STEEL.
All sizes of Cast and Machinery Steel constantly on hand.

WILLIAM H. WALLACE & CO.,
IRON AND STEEL,
10, 12 and 14 ALBANY ST.,
and 131 WASHINGTON ST.,
NEW YORK.

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

THE MAHONING VALLEY IRON CO.

— MANUFACTURERS OF —
Bar, Band, Sheet, Plate and Tank Iron,
Angle Iron, Nails, Boat Spikes and Rivets,

YOUNGSTOWN, OHIO.

EXHAUST TUMBLERS,
Hexagon, Round or Wooden
BEST AND CHEAPEST.

WM. A. SWEETSER.
39 Montello St., Brockton, Mass.

BIRMINGHAM IRON FOUNDRY,

BIRMINGHAM, CONN.

**CHILLED ROLLS AND ROLLING
MILL MACHINERY,**McCoy Patent Mill Pinions,
Shears, Rotary Squeezers.**WIRE DRAWING MACHINERY**

Special Rolling Machines for Gun Barrels, Hoes, Pick and Axe Polls, Odd Shapes and Tapers.

ESTABLISHED

1836.

POWDER

—FOR—

Blasting, Mining and Sporting.
ORANGE BRAND.
ELECTRIC BLASTING APPARATUS
SAFETY FUSE, &c.

Send postal card for Illustrated Pamphlet showing sizes grains Powder, and describing Blasting Apparatus. Mailed FREE.

LAFLIN & RAND POWDER CO.

New York Office, 29 Murray St.

DYNAMITE,**RED STAR BRAND**

For Mining, Quarrying & Stump Blasting

Safety Fuse, Caps, Platinum Fuse, Leadings and Connecting Wire, with every other requisite for Blasting Purposes. The especial attention of the hardware trade is invited to our line of goods.

NEW YORK POWDER CO.,

62 Liberty St., New York.

Patent Tumbling Barrels.

MANY VARIETIES

For all Kinds of Work.

Send for new Catalogue.

HENDERSON BROS., WATERBURY, CONN.**S. CHENEY & SON,
GRAY IRON CASTINGS,**

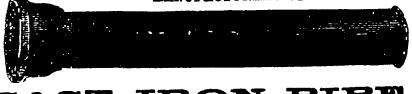
CHEAP HEATING STOVES,

DIAMOND THIMBLES

MANLIUS, N. Y.

DONALDSON IRON COMPANY,

MANUFACTURERS OF


CAST IRON PIPE
And Special Castings for Water and Gas. Also Flange Pipe
*Emaus, Lehigh Co., Pa.***FINE GRAY IRON**

FRANKLIN IRON FOUNDRY,

The Burr and Houston Company

33-39 Franklin Street, Brooklyn (Greenpoint), N. Y.

Special Attention Given to Fine Castings
Telephone Call, Greenpoint 174**CHESS BROTHERS,**

MANUFACTURERS OF A FULL LINE OF

SMALL CUT NAILS, TACKS, SHOE NAILS, ETC.

Always in stock. Special goods made to order.

SOFT STEEL PLATES.

Suitable for Implement manufacture and for all Blanking or Stamping uses, of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive, in widths up to 15½ inches and to multiples of lengths desired. Finished black or scaled. And

EXPANDED METAL

In all its varieties of Fire-Proof Lath, Fencing, Tree Guards, &c. Send for catalogues and prices.

Office, 531 Wood St., PITTSBURGH, PA.J.S. SEAMAN.
ROBT. SLEETH
GEO. P. BLACKPHOENIX ROLLWORKS
SEAMAN, SLEETH & BLACKOFFICE & WORKS
41ST & 42ND ST & AV.R.R.ROLLS
ONE
PINIONS
MANUFACTURE AND FINISH
EXCLUSIVELY
FOR ALL PURPOSES.

ESTABLISHED 1870

GEORGE MESTA, Pres.

W. D. ROWAN, Sec.

J. O. HORNING, Treas.

LEECHBURG FOUNDRY & MACHINE CO.,

Office: LEWIS BLOCK, Pittsburgh, Pa.

Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes

**ROLLS. MESTA'S PATENT PICKLING MACHINES AND TIN
PLATE MACHINERY.**

ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.

RAIL.
BEAM.
BAR.**ROLLS**STRUCTURAL.
SPECIALS.
SHAPES.

EAST CHICAGO FOUNDRY COMPANY,

Office, 716 "The Rookery," - - -

CHICAGO.

DROP FORGINGS

OF EVERY DESCRIPTION, IN IRON, STEEL, COPPER and ALUMINUM.

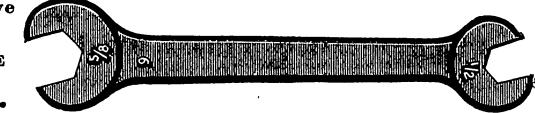
Hoist Hooks, Shafting Collars, Eye Bolts, Wrenches, Machine Handles, Fence Ornaments.

SPECIAL ATTENTION GIVEN TO THE MANUFACTURE OF

SPECIAL FORGINGS.**PHILADELPHIA DROP FORCE COMPANY,**

Office and Works, S. E. Cor. American and York Sts., Philadelphia.

New York Agents: BATT, BONNELL & THOMPSON, 34 Dey Street, N. Y.

**Haines Gauge Co.,**

906 Filbert St.,

PHILADELPHIA,
PA., U. S. A.The HAINES Automatic Micrometer Rolling
MILL GAUGE.

For reducing HOT WORK in process of rolling.

Pennsylvania Diamond Drill & Manufacturing Co.

BIRDSBORO, PA

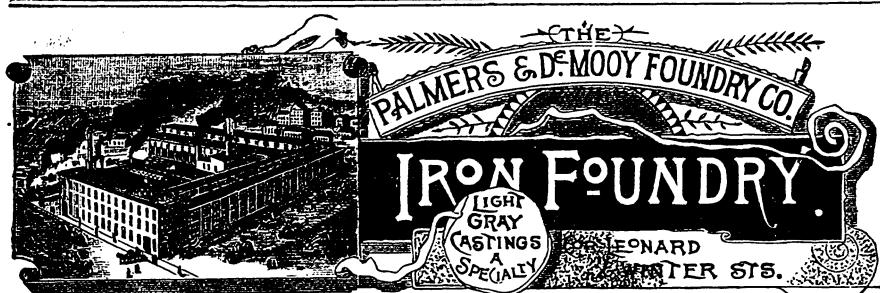
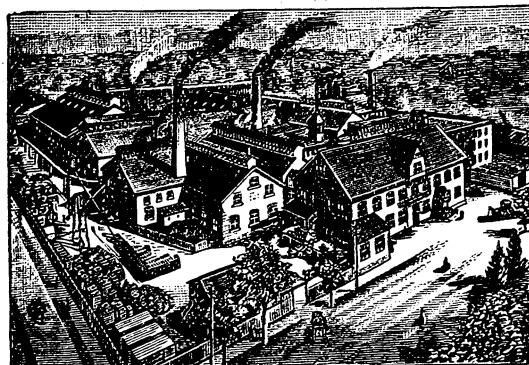
Drill Press and Planer Chucks. Steam and Gas Engines. Diamond Pointed Core Prospecting Drills. Boiler Fronts and General Castings. Mineral Lands Prospected and Artesian Wells Bored by Contract.

MACHINERY & ENGINEERING CO., Western Sales Agents, Chicago

Sessions Foundry Co., BRISTOL, CONN. IRON CASTINGS TO ORDER.

We make small and large castings of all descriptions, of best quality, and at very low prices.

CORRESPONDENCE SOLICITED.



Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. Metal Patterns designed and made. Also Japanning and Galvanizing. CLEVELAND, O.

STEEL CASTINGS

FROM 1 to 40,000 POUNDS WEIGHT,
Of Open Hearth, Chester or Bessemer Steel.
True to Pattern. Sound. Solid.
Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers.
Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.
Steel Castings of Every Description.
Chester Steel Castings Co.
Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

THE ROBINSON-REA MFG. CO., PITTSBURGH, PA.

SAND & CHILLED ROLLS. TIN PLATE PLANTS COMPLETE.

(No. 5.)

No. 6 RADIANT FACINGS

IS GOOD, IS BETTER, IS BEST.

Foundrymen who are using it say there is nothing its equal. Samples free.
Write for complete Catalogue of Foundry Supplies.

THE J. D. SMITH FOUNDRY SUPPLY CO., - CINCINNATI, O.

DROP FORGING.

ESTIMATES GIVEN ON APPLICATION.

Sole Manufacturers of Ahlstrom's Patent Parallel Double EXPANSION BOLTS,
also Single Expansion Bolts. Catalogues mailed on Application.

W. C. BOONE MFG. CO. - Office and Factory, - BOONTON, N. J.

JOHN M. SOLOMON, WILMINGTON, DELAWARE.

Fire Clays for Iron and Steel Furnaces. Furnace Sand for Heating Furnaces. Pits directly on P. W. & B. R. R. Samples on application.

Cranes AND Derricks.

W. S. HALSEY & CO., - Birdsboro, Pa.

R. D. Wood & Co. 400 Chestnut St.
PHILADELPHIA.

SOLE MAKERS OF THE

TAYLOR REVOLVING-BOTTOM GAS PRODUCER.

The best Producer for either Bituminous or Anthracite coal and Lignite; absolutely continuous in operation, as the fire is cleaned without stopping the flow of gas. Less labor required and less waste than in any other Producer. Producer Gas for firing Lime, Brick and Pottery Kilns, Sugar-house Char Kilns, Boilers, etc.

Also applicable to all Regenerative Furnaces. Send for Pamphlet.

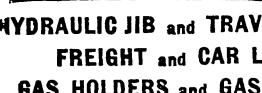
Patented in the United States and all Foreign Countries.



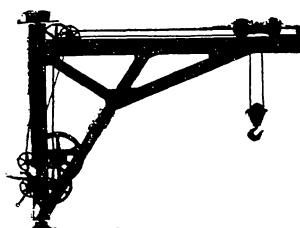
CAST IRON PIPE

MATHEWS'
FIRE HYDRANTS
EDDY VALVES,
VALVE
INDICATOR POSTS.

Heavy Loam Castings
Special Machinery.
Water Power Pumps
and TURBINES.


HYDRAULIC JIB and TRAVELING CRANES,
FREIGHT and CAR LIFTS, Etc.
GAS HOLDERS and GAS MACHINERY.

Detroit Foundry Equipment Co.



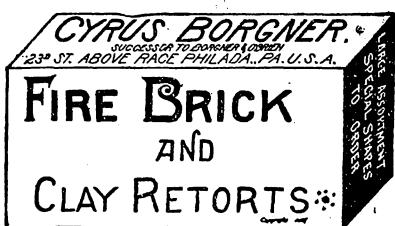
Cranes

THE WHITING CUPOLA.

Unequalled for Economy and Convenience.

LADDLES, TRUCKS,
TUMBLERS,
SAND SIFTERS, &c., &c.

CHICAGO: 225 Dearborn Street.
DETROIT: Michigan Ave. & D. & B. C. Ry.



ESTABLISHED 1856.

HENRY MAURER & SON,
MANUFACTURERS OF
FIRE BRICK
of all Shapes and Sizes,
420 E. 23d St., New York.

B. KREISCHER & SONS,
FIRE BRICK
BEST AND CHEAPEST.

ESTABLISHED 1845.

Office, foot of Houston Street, East River, NEW YORK.

ESTABLISHED 1864.

JAMES GARDNER & SON,
MANUFACTURERS OF
"STANDARD SAVAGE" FIRE BRICK
TILE and FURNACE BLOCKS
OF ALL SHAPES AND SIZES.
WORKS, Ellerslie, Allegheny Co., Md.
OFFICE, Cumberland, Md., P. O. Box 540.

S. M. Hamilton & Co., Agents, - Baltimore, Md.
Stowe, Fuller & Co., Agents, - Cleveland, O.

Established 1848.

OSTRANDER FIRE BRICK CO.,
Manufacturers of
FIRE BRICK
FOR ALL PURPOSES.
TROY, N.Y.

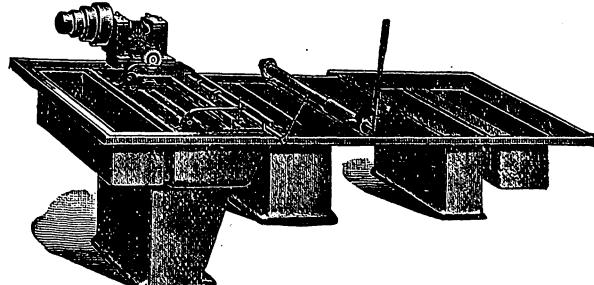
A Trial will
Convince You
THAT WE MAKE
SOFT AND SMOOTH
Light Gray Iron Castings,
- - SOUND - -
Brass and Bronze Castings
TRUE TO THE PATTERN.
Also HAVE FACILITIES FOR FINISHING.
Sample for estimate solicited.
I. S. SPENCER'S SONS, GUILFORD, CONN.



THE LLOYD BOOTH CO.,

YOUNGSTOWN,
OHIO.

Tinning
MACHINERY.



**Rolling Mills,
Sand and Chill
ROLLS.**

GRAY IRON, BRASS, ALUMINUM and ALUMINUM BRONZE CASTINGS
of the very best quality.

Very much time saved by using clean and soft castings. We use only the best material. A trial will convince you. PICKETS and ROSETTES for Wire Workers. Catalogue of same. NICKEL PLATING and JAPANNING, also METAL PATTERN MAKING and LIGHT MACHINE WORK. We invite correspondence.

HAIGHT & CLARK, - - ALBANY, N.Y.

ELECTRICAL BOOKS.

Electric Lighting for Marine Engineers ; or How to Light a Ship by the Electric Light and How to Keep the Apparatus in Order. By SYDNEY F. WALKER. 293 pages, Illustrated. 8vo, cloth ...\$2.00	Standard Tables for Electric Wiremen, with Instructions for Wiremen and Linemen. Rules for Safe Wiring, Diagrams of Circuits and Useful Formulae and Data. By CHARLES M. DAVIS. Third edition, thoroughly revised and edited by W. D. Weaver. Illustrated, 18mo, mor. ....\$1.00
The Dynamo, Its Theory, Design and Manufacture. By C. C. and F. WALLIS HAWKINS. 190 illustrations. Thick 12mo, cloth. (The Specialists' Series).....\$3.00	Practical Electric Light Fitting. By F. C. ALLSOP. A treatise on the wiring and fitting-up of buildings deriving current from central station mains and the laying down of private installations. 290 pages, 12mo, cloth.....\$1.50
Electrical Distribution. By M. H. KILGOUR, H. SWAN and C. H. W. BIGGS. Its Theory and Practice. 174 illustrations. 12mo, cloth.....\$4.00	Electrical Tables and Memoranda. By SYLVANUS P. THOMPSON and E. THOMAS. 128 pages, 2 x 2 1/4 inches, roan .....\$0.50
How to Use Electrical Measurement Apparatus. By CHAS. P. FREY. A Manual of Practical Information Relating to Electrical Testing. Illustrated. 8vo, paper.....\$0.50	Johnston's Electrical and Street Railway Directory. Fourth Year of Publication, 8vo, cloth.....\$5.00
Portable Electricity: Being a Treatise on the Application, Methods of Construction and Management of Portable Secondary Batteries. By J. T. NIBLETT. Fully Illustrated. 8vo, cloth.....\$1.00	Measurements of Electric Currents. Electrical Measuring Instruments, by JAMES SWINEBURNE. Meters for Electrical Energy. By C. H. WORDINGHAM. Edited by T. CONNERFORD MARTIN. Illustrated, 1 folding plate.....\$0.50
Practical Dynamo Building. By L. C. Atwood. With Detail Drawings and Instructions for Wind-ing. Giving correct sizes of Wire, Dimensions of Iron, etc. etc., also Diagram for House Wiring. Illustration and Plates. 4to, cloth.....\$3.00	Alternating Currents of Electricity. By GILBERT KAPP. Their Generation, Measurement, Distribution and Application. Authorized American edition. With an introduction by WILLIAM STANLEY, JR. (Reprinted from Professional Papers of the Corps of Royal Engineers). Illustrated, 12mo, cloth.....\$1.00
The Electric Transmission of Intelligence. By PROF. E. J. HUSTON. And other Advanced Primers of Electricity. 88 Illustrations. 12mo, cloth.....\$1.00	The Electric Railway in Theory and Practice. By O. T. CROSBY and DR. LOUIS BELL. Second edition, revised and enlarged, 183 Illustrations. 8vo, cloth.....\$2.50
The Dynamo, How Made and How Used. By S. R. BOTTONE. Eighth edition, with additional matter and illustrations. 12mo, cloth.....\$1.00	The Measurement of Electrical Currents and Other Advanced Primers of Electricity. By E. J. HUSTON. 429 pages, 160 illustrations.....\$1.50
DYNAMOS, ALTERNATORS and TRANSFORMERS. By G. D. KAPP. Giving an exposition of the general principles underlying the construction of dynamo-electric apparatus without the use of high mathematics and complicated methods of investigation. 12mo, cloth.....\$4.00	The Science and Practice of Lighting, as applied to sheets, open spaces and interiors. By W. H. Y. WEBBER. An elementary study. A series of articles contributed to the Journal of Gas Lighting, etc. 8vo, cloth.....\$1.40
Electric Light Installations. By Sir D. SALOMON. In 3 vols. Vol I. The Management of Accumulators; a practical handbook. Seventh edition, revised and enlarged, 164 pages, 12mo, cloth. \$1.50	Experimental Electricity. By E. T. TREVERT. Numerous illustrations. New revised and enlarged edition. 12mo, cloth.....\$1.00

Sent, post-paid, on receipt of price, by

DAVID WILLIAMS, PUBLISHER & BOOKSELLER
96-102 READE ST., NEW YORK.

Forgings of

TRETHEWEY MFG. CO., - 47th ST., PITTSBURGH, PA.

MANUFACTURERS OF

Machinery or

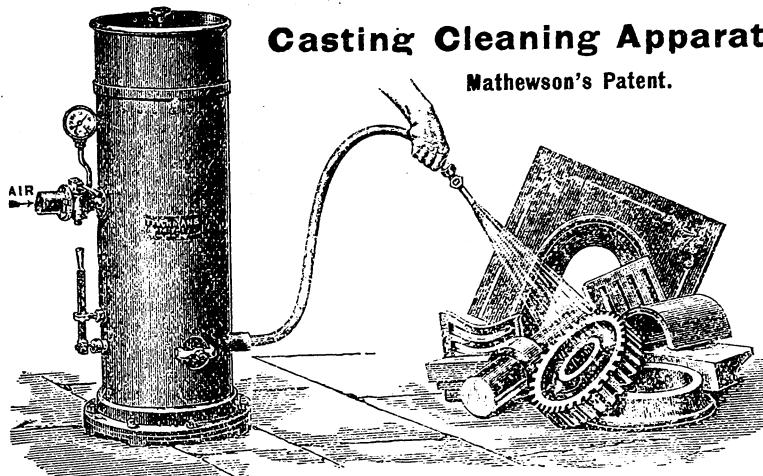
Tool Steel.

Rolling Mill Machinery, Steam Hammers, Squaring Shears, Double Headed Rotary Shears, Shear Grinding Machinery, Circle Cutting Machines, Roll Lathes, Hardened Forged Steel Rolls, Roll Turning Tools, Solid Steel Shear Knives, Tool Steel Dies of any size.

TILGHMAN'S PAT. SAND BLAST COMPANY, LTD.,

Casting Cleaning Apparatus

Mathewson's Patent.



SHEFFIELD, ENG.,

MANUFACTURERS OF

Patent Sand Blast Apparatus for sharpening and scouring files, cleaning steel, iron and brass castings, forgings, stampings, plates; &c.; also for obscuring, decorating and perforating all descriptions of glass, and cutting inscriptions and other designs on granite, marble and other stones.

THE S. R. SMYTHE COMPANY,

LEWIS BLOCK,

ENGINEERS AND CONTRACTORS,

PITTSBURGH, PA

**Regenerative Gas Furnaces and Gas Producers
For All Purposes.**

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc,

We contract for complete Plants, guarantee results and operation. OVER 100 PLANTS BUILT AND WORKING.

McAULEY FEED WATER HEATER AND PURIFIER. Clean Boilers Guaranteed at small cost. No scale, better service, and saving in fuel.

JULIAN KENNEDY.

Consulting and Contracting Engineer,

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

Blast Furnaces, Bessemer and Open Hearth Steel Works; Rolling Mills,

STEAM AND HYDRAULIC MACHINERY, &c.

—Branch Office of The Latrobe Steel Works.—

Wm. Swindell & Bros.,

ENGINEERS AND CONTRACTORS,

Regenerative and Recuperative Gas Furnaces for Steel, Iron and Glass.

SWINDELL'S IMPROVED GAS PRODUCERS,

243 BUILT SINCE APRIL 1, 1891.

P. O. Box 945.

548 Smithfield St., Pittsburgh, Pa

JOHN H. RICKETSON, Pres.
A. G. BARNETT, Treas.

W. L. RICKETSON, Supt.

O. G. RICKETSON, Vice-Pres.
A. G. MCCLINTOCK, Sec'y.

A. GARRISON FOUNDRY CO.,

Manufacturers of Sand, Patent Homogeneous Steel and

CHILLED ROLLS.

Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions and Rolling Mill Castings of every description.

Office : Nos. 10 & 12 Wood St., - PITTSBURGH, PA.

ALEX LAUGHLIN & CO.

LEWIS BLOCK, PITTSBURGH, PA.

Gas Heating

Gas Puddling

Open Hearth

Crucible

Tube Welding

FURNACES

AND ARTIFICIAL GAS PRODUCERS OF EVERY DESCRIPTION, for ROLLING MILLS, STEEL AND TUBE WORKS.

We guarantee to place all Plants erected by us in successful operation

M. V. SMITH, PRES.
C. C. MORROW, SEC.

M. A. GREENE, VICE-PRES.
JOHN A. ELLIOTT, TREAS.

**Artificial Gas
Engineering Co.,
Consulting and Contracting
ENGINEERS.**

ARTIFICIAL GAS applied to all Branches of Manufacturing and Domestic Uses. Apparatus for the Manufacture of Coal-Gas Furnished at Lowest Prices

**706 TIMES BUILDING,
PITTSBURGH, PA.**

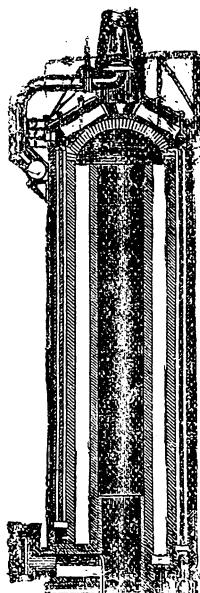
**HENRY AIKEN,
Consulting Mechanical Engineer,**

Rooms 203-206 Lewis Block,
PITTSBURGH, PA.

McCLURE & AMSLER,

Engineers and

Contractors



Bissell Block,
PITTSBURGH, PA.

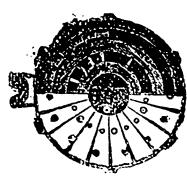
**Blast Furnace
Construction**

A SPECIALTY.

Sole Agents for
MASSICK'S & CROOKE'S
PATENT

**Fire Brick
Stoves,**

Designs and Estimates
for the construction of
Blast Furnace Work,
and for all kinds of Hot
Blast Fire Brick or Pipe
Stoves; and all other kinds
of Brick Work pertaining
to Steel Plants, Iron, Brick
or Wooden Buildings, all
kinds of Iron Construction
in general.



We propose to put into successful
operation all the plants we design and
contract for.

**The Iron-Masters'
LABORATORY**

Exclusively for the
Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

Branch Office, 339 Walnut St., Philadelphia.

All Analytical Work at Warrenton, Virginia.
J. BLODGET BRITTON.

This laboratory was established in 1868, at the instance of a number of practical Iron Masters expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

**THE COLLIAU PATENT
Cupola Furnace**
LEADS ALL OTHERS IN
ECONOMY,
CAPACITY,
DURABILITY.
Correspondence Solicited.
BYRAM & COMPANY,
Exclusive Manufacturers,
DETROIT, - - - MICH

Pocket Companion. Containing useful information and tables appertaining to the use of wrought iron and steel as manufactured by Carnegie, Phipps & Co., Ltd., Pittsburgh, Pa. For engineers, architects and builders. 1892 edition. Edited by C. L. STROBEL, C.E., assisted by F. H. KNDL, C.E. Leather with flap, 334 pages. \$2.00
For Sale by David Williams, 98-102 Reade St., N.Y.

JAMES HEMPHILL, President.
WM. H. CONLEY, Treasurer.

THOS. B. RITER Vice-President.
JNO. F. WILCOX, Gen'l Manager.

PITTSBURG IRON & STEEL ENGINEERING CO.

LEWIS BLOCK, PITTSBURG, PA., U.S.A.

BESSEMER AND OPEN-HEARTH STEEL PLANTS.

Rolling Mills (Blooming, Rail, Plate, &c). Blast Furnaces, Engines
Boilers, Bridges, Girders, Iron Buildings.

WORKS BUILT COMPLETE and Fully Equipped for Operation.

**THE D. R. LEAN COMPANY,
Blast Furnace and
Steel Plant Construction,**

Penn Building, Pittsburgh, Pa.

J. A. HERRICK, M. E.,

Consulting Engineer and Contractor:

Room 609, 284 Pearl Street, NEW YORK.

STEEL CASTING PLANTS A SPECIALTY.—

Melting and Heating Furnaces of ALL KINDS.

Patent Gas WATER VALVES. Improved "BASIC" and "SEMI-STEEL" Processes and FURNACES.

New CONTINUOUS Gas PRODUCERS.

Corliss Blowing Engines,

Gas and Air Compressors,
either horizontal or vertical,
simple or compound.

Corliss or liberating gear
Rolling Mill or Hoisting Engines. Special girder frames
and heavy moving parts.

BLAST FURNACE EQUIPMENT.

Philadelphia Engineering Works,

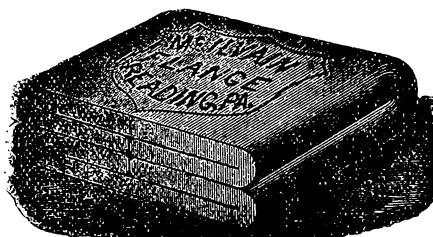
LIMITED,

Mifflin Street, East of Front Street, Philadelphia, Pa.

Long Distance Telephone, 1781. - - - - -

NEW YORK, W. M. POWER, 121 Liberty St. **CHICAGO,** W. F. PARISH MACH'Y CO., Home Ins. Bldg.

TENSILE STRAIN. { 56,000 to 64,000 lbs.



CAPACITY. { Plates 1 inch thick to No. 12.
30 feet long.
70 inches wide.

WM. McILVAIN & SONS,

READING, PA.

MANUFACTURERS OF

IRON AND STEEL

BOILER PLATES.

Locomotive, Fire Box, Flange, Shell,
Tank Iron and Steel, including Plates for
Bridges, Girders, Stacks, Pipe and Fire
and Burglar-proof Safes.

THE ALLEN TOWN ROLLING MILLS,

MANUFACTURERS OF

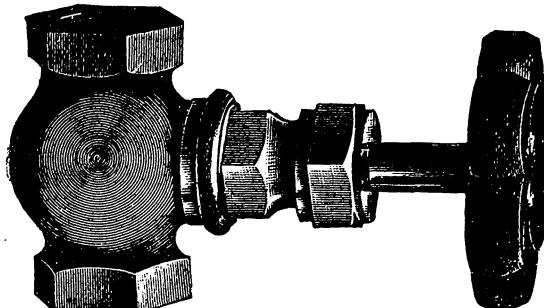
Pig Iron, Merchant Bar Iron, Rolled Shafting, Mine Rails, I-Beams, Tee Bars, Fish
Plates, Bolts, Nuts and Spikes.

Transfer and Locomotive Turn Tables, Blast Furnace, Rolling Mill and Mining Ma-
chinery, Mining Pumps, Etc. Roll Trains, Shears, Punches, Iron Trucks, Etc. Builders
of all classes of Machinery, Makers of Castings of all descriptions for Cable and
Electric Railway.

**BLAST FURNACES,
ROLLING MILLS,
STEEL WORKS,
MINES, ETC.,
ETC.**



**OIL WELLS,
REFINERIES,
ELECTRIC LIGHT PLANT,
WATER WORKS, ETC.
ETC.**



McNAB & HARLIN MFG. CO.,
—MANUFACTURERS OF—
BRASS COCKS AND VALVES

For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials. Seamless
Brass and Copper Tubes.

Factory, PATERSON, N. J.

56 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



THE CONTINENTAL IRON WORKS

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS OF—

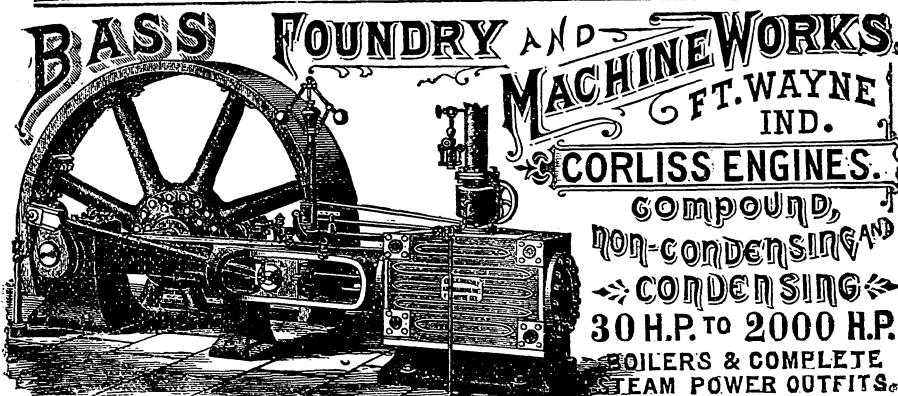
CORRUGATED FURNACES, FOR MARINE AND LAND BOILERS.

Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Thos. F. Rowland, Pres.
Thos. F. Rowland, Jr., Treas.

Warren E. Hill,
Chas. H. Corbett, Vice-Pres.

Take Ferry from East 10th or 23d Streets, N. Y., to Greenpoint.



WILLIAM TOD & CO.

YOUNGSTOWN, OHIO.

SINGLE, COMPOUND
AND CONDENSING.

**PORTER-HAMILTON
ENGINE**

Blowing Engines,
Hydraulic Cranes & Accumulators
Heavy Special Machinery.
ENGINE CATALOGUE ON APPLICATION.

The Improved
**WHARTON - HARRISON
SAFETY BOILER,**

For all Power and Heating Purposes.
Single Boilers 2-240 H.-P.
Batteries of any Capacity.

THE COCHRANE
FEEDWATER HEATER.

THE COCHRANE
FEEDWATER HEATER & PURIFIER.

THE COCHRANE

SEPARATOR.

Horizontal or Vertical Form. For Obtaining
Dry Steam. Purified Exhaust.

FOR PARTICULARS ADDRESS

Harrison Safety Boiler Wks.,
Germantown Junction. PHILADELPHIA, PA.

John McLean,
Manufacturer of
Ayers' Hydrants.

Stop Cocks and Gal.
Galvanized Cemetery Supplies
296 & 298 Monroe St., N.Y.

Totten & Hogg I. & S. F'dry Co.,

Manufacturers of

The "Atna" Rolling Mill

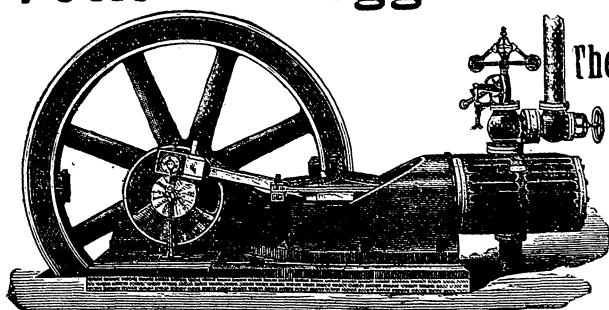
ENGINE

Chilled and Sand
Rolls and Rolling Mill
Machinery,
PITTSBURGH PA.

BOSTON GEAR WORKS

37 Hartford St., Boston, Mass.
HEADQUARTERS FOR GEARS.

Book on Gears, 170 Illustrations, \$1.00. Job Gear
Cutting of all kinds. Spur, Bevel, Spiral, Ratchet,
Worm, Rack, Elliptic, Index Plates, &c. Very small
or large. Send for 1892 Catalogue; 900 sizes of Gears;
FREE to any business firm.



ESTABLISHED 1870. INCORPORATED 1893.

ERIE ENGINE WORKS

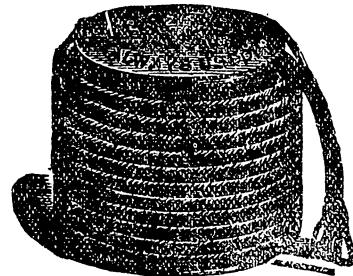
(CLEVELAND & HARDWICK.)



ERIE, PA.
Manufacturers of
**STEAM ENGINES
AND BOILERS.**



SEND FOR CATALOGUE "A"



Send for a Sample of
Morrison's Patent Self-Lubricating Packing,
ROBT. MORRISON,
5034 Arsenal St.,
St. Louis, Mo.

VULCAN IRON WORKS

CHICAGO
FILE DRIVERS

Electric Motor Construction for Amateurs.

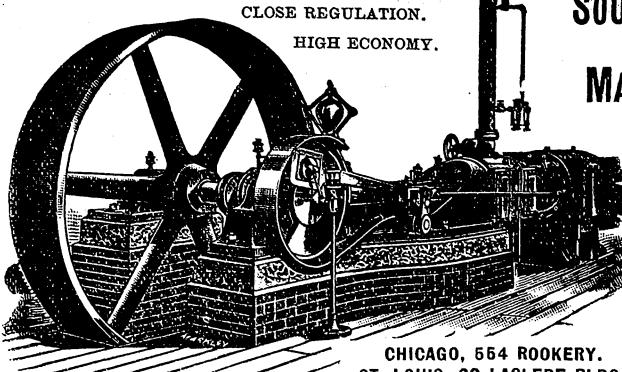
By C. D. PARKHURST.

Gives directions and working drawings for making an electric motor to run sewing machines, small lathes, etc., with rules for constructing the battery to furnish the electrical current, and much practical relative information.

A table indicating the difference in wire gauges is included.

Price, \$1.00.

Sent, post-paid, on receipt of price by
DAVID WILLIAMS. Publisher & Bookseller,
96-102 Reade Street, New York.



CLOSE REGULATION.
HIGH ECONOMY.

**SOUTHWARK FOUNDRY
AND
MACHINE COMPANY,**
Philadelphia, Pa.
Sole Makers of
**THE PORTER-ALLEN
AUTOMATIC ENGINE,**
SIMPLE, COMPOUND
OR TRIPLE EXPANSION.
Also Builders of
BLOWING ENGINES,
REVERSING ENGINES,
CENTRIFUGAL PUMPS,
BOILERS, TANKS, ETC.

CHICAGO, 554 ROOKERY.
ST. LOUIS, 32 LACLEDE BLDG.

LUNKENHEIMER'S GRAPHITE LUBRICATOR

IS intended for Engine Cylinders and Steam Pumps, and attached like any ordinary sight-feed lubricator.

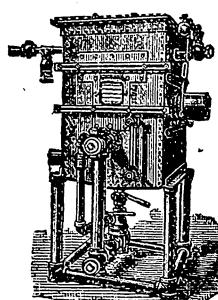
Automatic, Efficient, Economical, Low-Priced.

Made in three sizes, holding from 3 to 8 ounces of flake graphite.

Satisfaction Guaranteed. Write for circulars and prices and catalogue of superior Globe, Angle and Check Valves, "Lunken" Gate Valves, "Handy" Gate Valves, Lever Throttle Valves, Pop Safety Valves, Sight-Feed Lubricators, Whistles, Oil Pumps, Glass Oil Cups, Grease Cups, Loose Pulley Oilers, etc. "LUNKENHEIMER" on brass goods means the best.

FOR SALE BY DEALERS EVERYWHERE.

THE LUNKENHEIMER COMPANY,
CINCINNATI, O., U.S.A.



WE GUARANTEE YOU

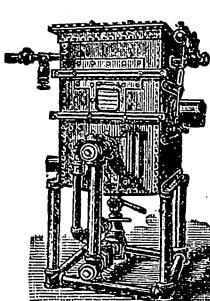
a very considerable saving in the items of water and fuel by the use of our Vacuum Feed Water Heater and Purifier, and this means, of course, an extra profit on your output. The "how" will be found in a comprehensive Catalogue, which is yours for the asking, also Catalogues of the Webster Separator and Williams Vacuum System of Steam Heating.

WARREN WEBSTER & CO.,

NEW YORK, 126 Liberty Street.
CHICAGO, Monadnock Building.

NO. 2.

CAMDEN, N. J.



WE NEVER SOLD ONE

of our Vacuum Feed Water Heaters and Purifiers until we had first satisfied our customer that it was capable of saving money for him. Our Catalogue will make this saving clear to you. Shall we mail it? We also build the Webster Separator and Williams Vacuum System of Steam Heating.

WARREN WEBSTER & CO.,

NEW YORK, 126 Liberty Street.
CHICAGO, Monadnock Building.

NO. 8.

CAMDEN, N. J.



DROP FORGED

MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N.Y.



THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas.

BOARD OF DIRECTORS:

J. M. ALLEN, President.
FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.
CHARLES M. BEACH, of Beach & Co.
DANIEL PHILLIPS, of Adams Express Company.
RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.
THOMAS O. ENDERS, of the United States Bank.
LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.
GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.
NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.
HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.
A. W. JILLSON, late Vice-Prest. Phoenix Fire Insurance Co., Hartford, Conn.
EDMUND A. STEADMAN, President of the Fidelity Co., Hartford, Conn.
GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.
HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.
C. C. KIMBALL, Prest. Smythe Manufacturing Co., Hartford, Conn.
PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

THE EYNON-EVANS MANUFACTURING CO.,

Patentees and Manufacturers of **THE EYNON-KORTING COMPOUND INJECTORS.**

Extra Heavy Globe and Angle Valves.  Brass Castings up to 5000 lbs.

Blowers, Ventilators, Blast Nozzles, Exhausters, Brass Siphons, Acid Siphons, Condensers.

Fifteenth and Clearfield Sts., Philadelphia, Pa.

The C. & C. ELECTRIC COMPANY

—MANUFACTURERS OF—

MULTIPOLAR DYNAMOS, DIRECT DRIVEN OR BELTED,

IN SIZES UP TO 250 H.-P.

Bipolar Dynamos up to 100 H.-P. Electric Motors, Automatic or Hand Controlled.
Complete Plants for Power Transmission. Isolated Lighting Plants.
Central Station Apparatus.

General Office, 143 Liberty St., New York. Works, Garwood, N. J., on Central R. R. of N. J.

BRANCH OFFICES : CHICAGO, Monadnock Building. BOSTON, 63 Oliver Street. CLEVELAND, Cuyahoga Building. PHILADELPHIA, 633 Arch Street.

DYNAMOS

—FOR—

Electro-Plating.

SIMPLE,
DURABLE and
EFFICIENT.

The Best Machine Made
Satisfaction Guaranteed.

—THE—

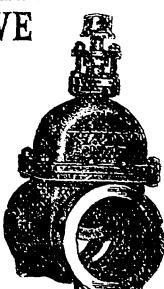
Eddy Electric Mfg. Co
Windsor, Conn.

CHAPMAN VALVE
MFG. CO.

Manufacturers of
VALVES & GATES

For Water, Steam, Gas,
Ammonia, &c.

GATE FIRE HYDRANTS,
With and without independent outlets.

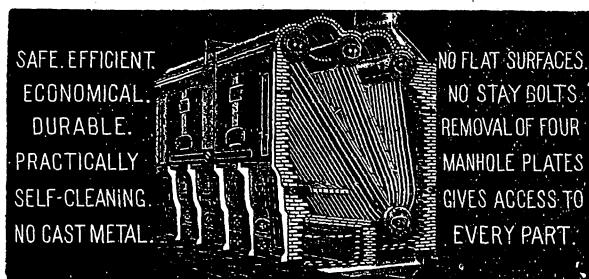


We make a specialty of Valves with Bronze seats for High Pressure steam.
Works and General Office.

INDIAN ORCHARD, MASS.
Treasurer's Office,

72 Kilby and 112 Milk Streets,
Boston, Mass.
Chicago Office, 24 West Lake St. New York Office,
28 Platt Street.

ROLLASON GAS ENGINES
RELIABLE AND ECONOMICAL
Send for Catalogue, etc. HAVE MEYER BLDG. NEW YORK.



THE STIRLING WATER TUBE SAFETY BOILER.

74 Cortlandt St., New York.
418 Walnut St., Phila.
Cuyahoga Building, Cleveland.

THE STIRLING CO.,
Gen'l Offices, Puliman Building,
CHICAGO, ILL.

POWER FROM GASOLINE.

DIRECT FROM THE TANK.

CHEAPER THAN STEAM. No Boiler. No Steam. No Engineer.

FOR USE EVERYWHERE.

OTTO GASOLINE ENGINES, Stationary or Portable.

1 to 50 H. P. 8 to 20 H. P.

Running Expenses, Less than one cent per horse power per hour. For large engines, one-half cent per horse power per hour. Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply. The Best Auxiliary Power for Night Work.

OTTO GAS ENGINE WORKS,

33d and Walnut Sts., PHILADELPHIA, PA.

CHICAGO OFFICE: 245 Lake St.

BOSTON OFFICE: 19 Pearl St.

THE AMERICAN FEED WATER HEATER

Received the First Prize at the

Mechanics' Association Fair, - - - Boston, Mass.

What you get when you buy the AMERICAN HEATERS:

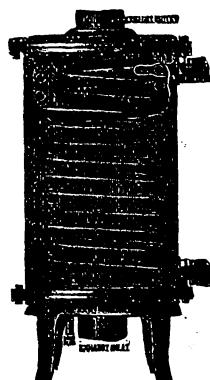
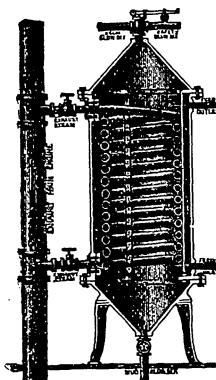
COPPER COILS,
SOLIDLY BRAZED,
GUN METAL FITTINGS
AND CLAMP STAYS,
STEEL SHELLS,

NO RUSTING OUT,
NO LEAKY JOINTS,
NO TROUBLE FROM EXPANSION,
NO BACK PRESSURE,
NO OIL IN BOILER.

We guarantee this Heater to be the Most Durable, Effective and Cheapest

WHITLOCK COIL PIPE CO.,

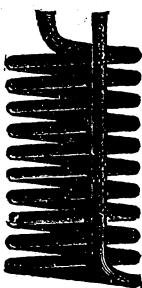
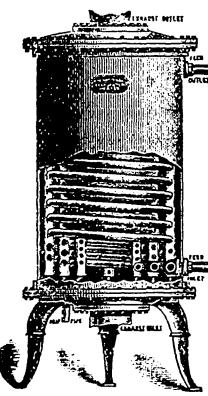
27 South Street, - - - Elmwood, Conn.



The National Feed Water Heater

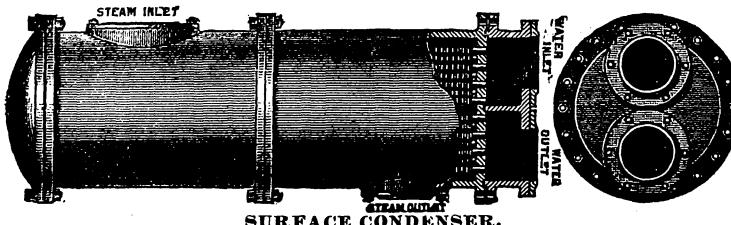
is a BRASS COIL HEATER, delivering water to the boilers at 212° Fahrenheit. It is low in price, but unequalled in efficiency. 500,000 H. P. in daily use attests its merits.

Coils and Bends of Iron, Brass, and Copper Pipe.



THE NATIONAL PIPE BENDING CO.,
98 River St., New Haven, Conn.

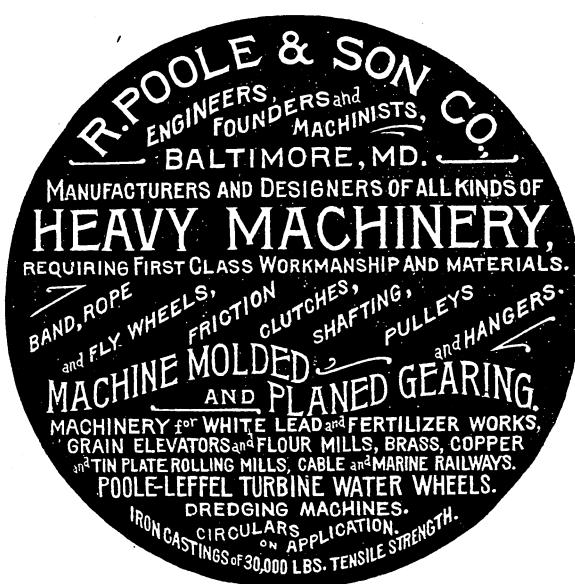
The WAINWRIGHT FEED WATER HEATER



is a straight corrugated copper tube heater, and is making a record which its competitors find hard to beat. Send for the whole story to

THE TAUNTON LOCOMOTIVE MFG. CO.
TAUNTON, MASS.

Awarded the Grand Prize at Late Paris Exposition.



RAND DRILL COMPANY.

We were Awarded the Highest Premium at the WORLD'S COLUMBIAN EXPOSITION on the following :

DUPLEX COMPOUND STEAM AND COMPOUND AIR COMPRESSOR, AT MACHINERY HALL,

And the following, exhibited at Mines and Mining Building :

High Pressure Compressor, Straight Line Compressor,

Little Giant Rock Drill,

Slammer Rock Drill,

Furnace Tapping Drill,

Shaft Bar,

Column,

Derby Bit, and

Award on Collective Exhibit of Compressors and Drills.

RAND DRILL CO.,

23 Park Place, N. Y.



BOOKS

—ON—

Mechanical and Steam Engineering.

Modern American Locomotive Engines,

their Design, Construction and Management. A practical work for practical men. By EMORY EDWARDS, M. E. Illustrated by 78 engravings; 383 pages; cloth..... \$2

Engineers' Sketch Book.

By THOMAS WALTER BARBER, engineer. Nearly 2000 illustrations, descriptive notes and memoranda; 243 pages; cloth..... \$3

Locomotive Engine Running and Management.

A practical treatise on the locomotive engines, showing their performance in running different kinds of trains with economy and dispatch; also directions regarding the care, management and repairs of locomotives and all their connections. Illustrated by numerous engravings. Seventeenth edition By ANGUS SINCLAIR, M.E. Cloth..... \$2

Stationary Steam Engines.

Especially adapted to electric lighting purposes. Treating of the development of steam engines—the principles of construction and economy, with description of moderate speed and high speed engines. By Prof. R. H. THURSTON. Fourth edition; 177 pages cloth..... \$1.50

Thermo-Dynamics, Heat Motors, and Refrigerating Machines

By PROF. DE VOLSON WOOD. Third edition, revised and enlarged; 452 pages; cloth.... \$4

Mechanics' and Engineers' Pocket Book.

By CHAS. H. HASWELL. Fifty-fifth edition; 956 pages; leather..... \$4

Manager's Hand-Book of Modern Rules,

Tables and Data for Civil and Mechanical Engineers, Millwrights and Boiler Makers, Tool Makers, Machinists and Metal Worker's Iron and Brass Founders, &c. By W. S. HUTTON. Thick 8vo, half-bound..... \$6

Valve Gears.

Analysis by Zeuner Diagram. By H. W. SPANGLER, P. A. Engr. U. S. Navy; 160 illustrations; cloth..... \$2.50

The New Catechism of the Locomotive.

Rewritten and enlarged with new matter and illustrations selected from the latest practice in this country. By M. N. FORNEY; 709 pages; cloth..... \$3.50

A Treatise on Toothed Gearing,

Containing complete instructions of designing, drawing and constructing spur wheels, bevel wheels, lantern gear, screw gear, worms, &c., and the proper formation of tooth profiles. For the use of machinists, pattern makers, draftsmen, designers scientific schools, &c. With many plates. By J. HOWARD CROMWELL, Ph.B. Third edition; 245 pages; cloth..... \$1.50

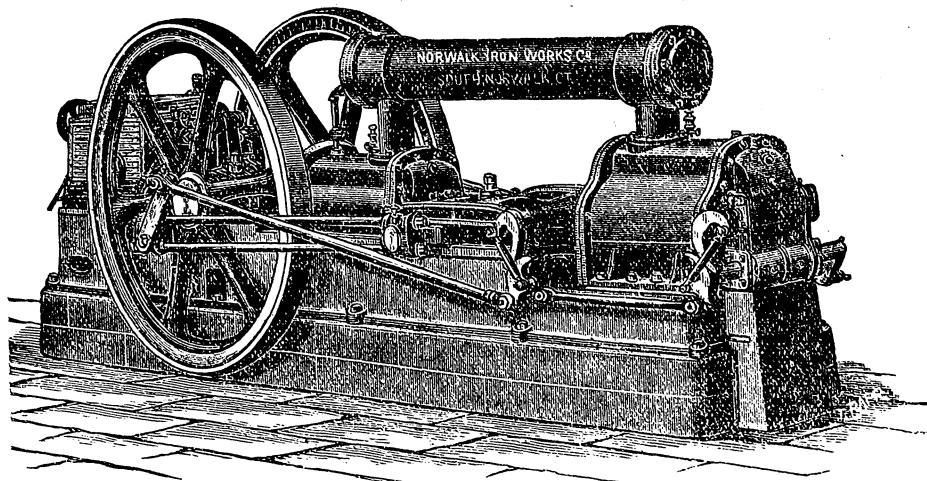
Sent, post-paid, on receipt of price by

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 READE ST., - NEW YORK.

Air Compressors.



THE NORWALK IRON WORKS CO., South Norwalk, Conn.

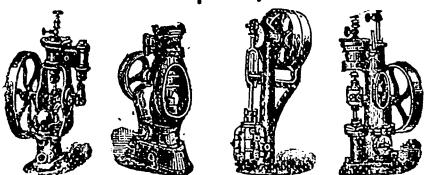


**CHEAPEST.
HANDIEST.
SIMPLEST. PUMPS.**
Handling Dirty, Gritty and Sandy Liquids, without Wear, Oil or Care. Pumping outfit for Contractors, Mining, Irrigating, Railroad, Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps, and other Machinery always on hand. Exchanging.
MASLINS, 165-167 First St., Jersey City, N.J.



Send
for
Prices.

VALLEY PUMP CO.
Easthampton, Mass.



The Metal Worker's Handy-Book

OF RECEIPTS AND PROCESSES,

BEING A COLLECTION OF CHEMICAL FORMULAS AND PRACTICAL MANIPULATIONS FOR THE WORKING OF ALL THE METALS AND ALLOYS, INCLUDING THE DECORATION AND BEAUTIFYING OF ARTICLES MANUFACTURED THEREFROM, AS WELL AS THEIR PRESERVATION.

Edited from Various Sources by

WILLIAM T. BRANNET.
500 Pages, Cloth, \$2.50.

THE TECHNO-CHEMICAL RECEIPT BOOK.

CONTAINING

SEVERAL THOUSAND RECEIPTS, COVERING THE LATEST MOST IMPORTANT AND MOST USEFUL DISCOVERIES IN CHEMICAL TECHNOLOGY, AND THEIR PRACTICAL APPLICATION IN THE ARTS AND THE INDUSTRIES.

Edited from the German with Additions by

WILLIAM T. BRANNET.
495 Pages, Cloth, \$2.00.

Sent post-paid on receipt of price, by

DAVID WILLIAMS, Publisher & Bookseller,
96-102 Reade St., New York.

**DEAN BROTHERS'
Steam Pump Works,
INDIANAPOLIS, IND.**

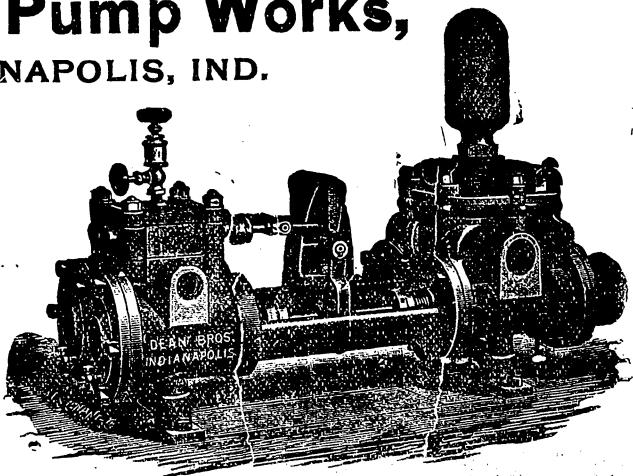
DUPLEX PUMPS.

SINGLE PUMPS.

DEEP WELL

PUMPS.

Send for Catalogue
and Prices.



The JOHN H. MCGOWAN CO.

CINCINNATI, OHIO. PRICE LIST
FACTORY OFFICE, 46 CENTRAL AVE. ON APPLICATION

Brass Founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

BRANCH HOUSE, Richmond, Va.
1425 E. Main St.

**Worthington Steam Pumps
CONDENSERS and WATER METERS.**

HENRY R. WORTHINGTON,

86 & 88 LIBERTY STREET, NEW YORK.

BOSTON,

ST. LOUIS,

PHILADELPHIA,

DENVER.

CHICAGO,

The WATERBURY-FARREL FOUNDRY & MACHINE CO., Waterbury, Connecticut,

Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from Sheet Brass, Copper, Steel, Silver, &c., **POWER PRESSES**, **HYDRAULIC PRESSES**, Drop Presses, Foot Presses, **RIVET MACHINES**, Gang Sitters, Grinding Machines, Steel Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.

The Brown Hoisting and Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.,

Sole manufacturers of the

"BROWN HOIST"

A NEW AND COMPLETE SYSTEM FOR HANDLING OF MATERIALS.

The Brown Patent Cable Tramway system.

The Brown Patent Suspended Beam Tramway system.

The Brown Patent Bridge Tramway system.

The Brown Patent Shed Tramway system.

The Brown Patent Furnace Stock Distributer.

The Brown Patent Warehouse Tramway system.

The Brown Patent Sewer Machine Tramway system.

The Brown Patent Continuous Elevated Tramway system.

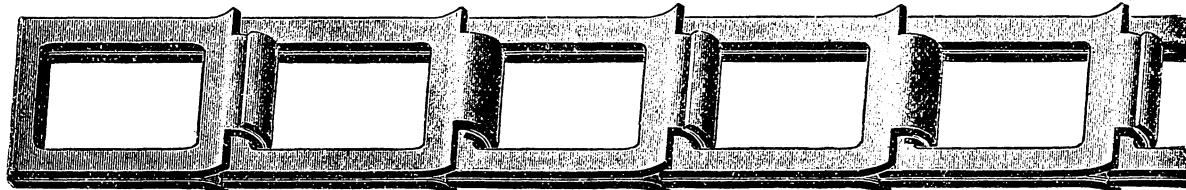
The Fayette-Brown Patent Automatic Furnace Hoist.

The Brown Patent Friction Clutch Hoisting Engine.

Self-Dumping Buckets, Skip Cars, Friction Clutches, etc.

The Most Perfect Clutch.

ROBERTS MFG. CO. - - - PITTSBURGH, PA.



PATENT DETACHABLE STEEL LINK BELTING,

Send for Catalogue and Price-List.

Sprocket Wheels and Shafting.

JEFFREY CHAIN BELTING.

Also MALLEABLE, WROUGHT, STEEL AND SPECIAL CHAINS for

Elevating and Conveying Machinery

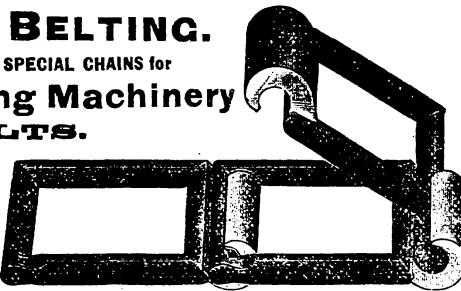
DRIVE BELTS.

Send for Illustrated Catalogue and Reduced
Price-List.

THE JEFFREY MANUFACTURING CO

COLUMBUS, OHIO, U. S. A.

New York Branch, 163 Washington St.



Talcott's Clinching Belt Hooks.



W. O. TALCOTT, Providence, R. I.

MANUFACTURER OF

Four Styles of BELT HOOKS, Including 134 Sizes.

SEND FOR CATALOGUE.

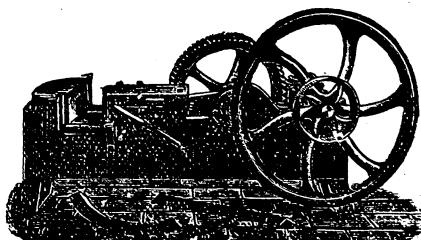
PITTSBURGH MFG. CO.,

Manufacturers of

Crosgrove's Patent Straightening, Bending and Punching Machines.

NAIL MACHINERY.

Bolts, Nuts, Rivets, Castings, &c.



PITTSBURGH - - - PA.

DURANT COUNTING MACHINES

Received the Highest Award at the
World's Columbian Exposition.



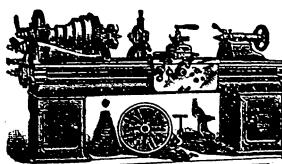
Send for
Catalogue
to

W. N. DURANT, 234 22d St., Milwaukee, Wis.

FITCHBURG MACHINE WORKS,

MANUFACTURERS OF THE CELEBRATED

FITCHBURG



AND OTHER

SEND FOR
CATALOGUE B.

ENGINE LATHE

METAL-WORKING MACHINES,

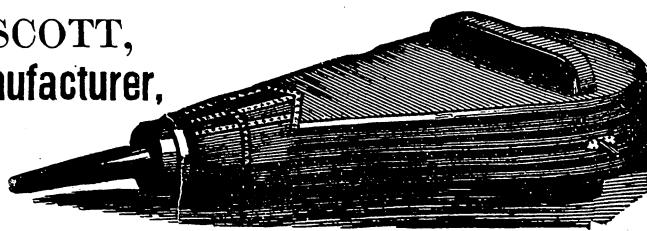
**FITCHBURG,
MASS.**

**GEO. M. SCOTT,
Bellows Manufacturer,**

Johnson Street,

Cor. 22d St.,

CHICAGO, ILL.



FOR THE
"Double Triple Quick Stroke"
SHAPER

WRITE TO
GOULD & EBERHARDT, Newark, N.J.



18 in., 16 in., 20 in., 24 in., 26 in., 30 in. stroke.

LEVIATHAN BELTING.



Positively unequalled for Strength, Durability and Traction Power; unaffected by Heat, Steam or Water.

Belts for Main Driving and work of a heavy nature a specialty.

MAIN BELTING COMPANY,

Sole Manufacturers,
1219-1235 Carpenter St.,
PHILADELPHIA.

248 Randolph Street, Chicago.
120 Pearl Street, Boston.

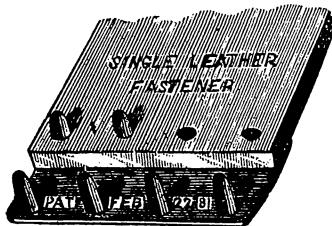
Send for Price-Lists and Samples.

ALEXANDER BROS. BEST OAK BELTING.

PHILADELPHIA.

Patterson, Gottfried & Hunter, Limited, agents,
146-150 Centre St., New York, N. Y.

Thacher's Patent BELT FASTENERS.



Manufactured by

The Clafien Manufacturing Co., Cleveland, O.
Office, 71 and 73 Ontario St.

**TWO
BLADES
OF
GRASS.**

THIS IS THE TITLE of a little booklet we have just issued ON OUR GARDEN HOSE. The booklet in some features is new. The hose of which it treats is also new in some features, though old and tried in reputation. We offer this year:



RUBBER HOSE—(Three Grades).

CARBON, - - - - - Good.

DOUBLE DIAMOND, - - - - Better.

1846-PARA, - - - - Best.

COTTON HOSE—(Two Grades):

SPIDER, - - - - - Good.

DOUBLE DIAMOND, - - - - Best.

Send for one. Learn the moral and be numbered among the public benefactors who make "Two Blades of Grass grow where there was one before."

NEW YORK BELTING & PACKING CO. LTD

PIONEERS AND LEADERS,

15 PARK ROW, NEW YORK.

Hosted by Google

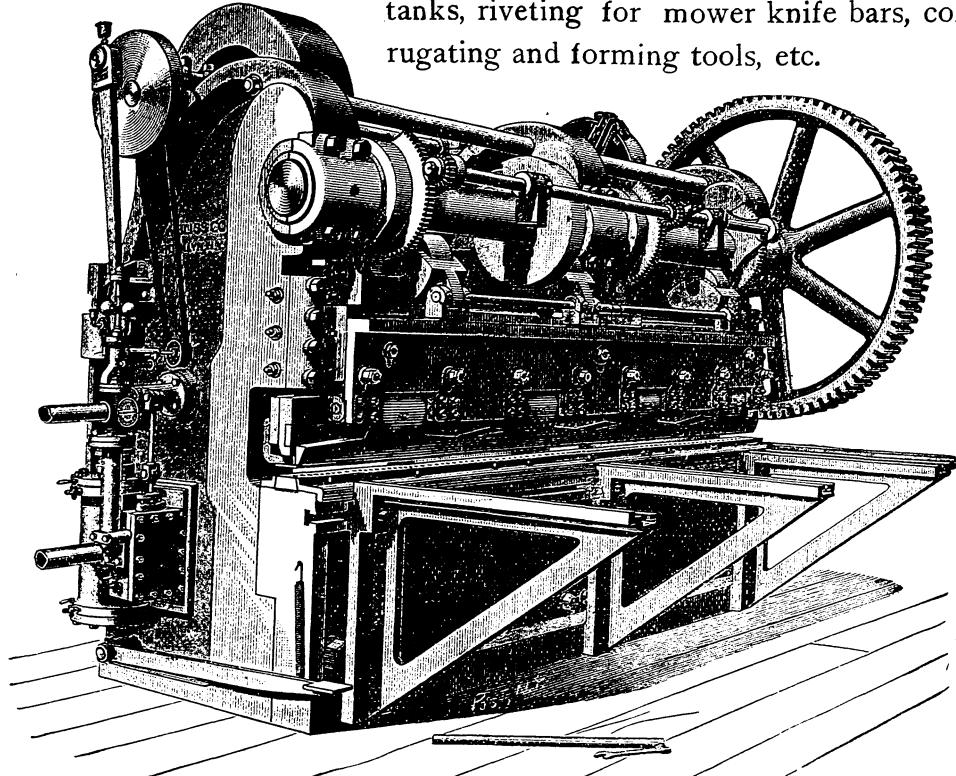
E. W. BLISS CO.,

11 ADAMS ST., BROOKLYN, N. Y.

Western Office, 14 N. Canal Street, Chicago.

PRESSES,
PUNCHES,
SHEARS,
DROP
HAMMERS,
DIES AND
SPECIAL
MACHINERY.

THE STILES & PARKER
PRESS CO.

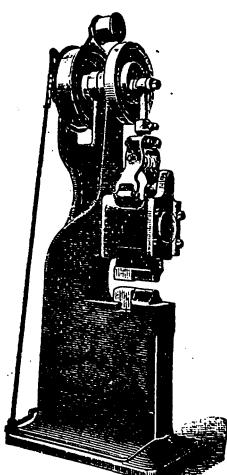


"BLISS" GANG PUNCH,

No. 11½.

WITH CAM-STRIPPER AND STEAM ENGINE.

This machine is especially designed for operating narrow dies of great length, such as gang punching dies for boilers and tanks, riveting for mower knife bars, corrugating and forming tools, etc.



The Dupont Power Hammer STANDS FIRST

I N

{ Simplicity of Adjustment,
Simplicity of Construction,
Economy of Power,
Economy of Space,
Durability,

And costs less than any hammer built. Send for our new descriptive circular to

**The Dupont Manufacturing Co.,
ST. JOHNSBURY, VT.**

The Dupont Power Hammer.



STAR LOCK WORKS, PHILA.

W. & L. WOLF,

MANUF'RS OF

1ST QUALITY ONLY

SCANDINAVIAN

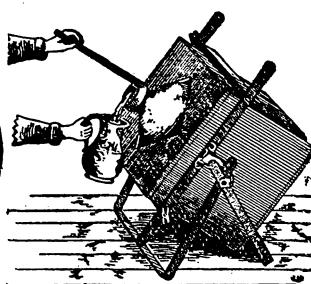
AND

Spring Padlocks,

Trunk & Case Locks,

Carboy Stands, &c.

Catalogues Sent on Application.



A. L. HENDERER,

Wilmington, Del.

MANUFACTURER OF

Hydraulic Jacks, Hydraulic
Punches, Screw Punches,

Steel Tube Expand-

ers, Flue Hole Cut-

ters, Boiler Test

Pumps and Pipe

Vises.

RIEHLE

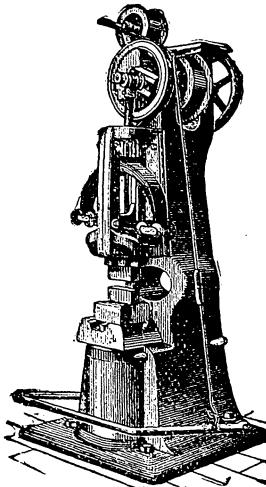
BROS. TESTING MACHINE CO., Phila., have issued a new describing and illustrating all the various styles of their U. S. Standard Testing Machinery with the special appliances. Marble Machinery, Rope Twisters, Loam Mills, Riehle-Roble Frictionless Ball Screw Jacks, Iron and Wooden Trucks, &c., &c., are described. It is desired to have one of these Catalogues in the office of every Superintendent, Purchasing Agent, Engineer or Manufacturer using such Machinery. A copy will be mailed free of charge to those who may apply.

CAT. No. 3

If You Use Power Hammers

Write to us for Circulars.

**SCRANTON & CO.,
NEW HAVEN, CONN.**



Chicago Office, 65 South Canal Street.

BARNES' UPRIGHT DRILLS.

Complete line, ranging from our New Friction Disk Drill, for light work, to 42-inch Back Geared Self Feed Drill.

Send for Catalogue and Prices.

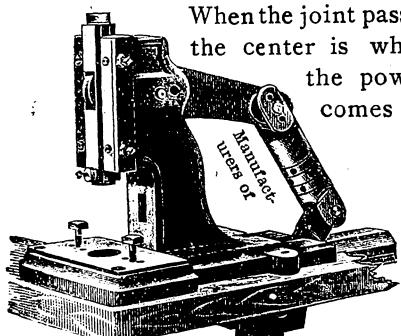
W. F. & JOHN BARNES CO.

69 Ruby St., Rockford, Ill.

ENGLISH AGENTS, CHAS: CHURCHILL & CO.,
21 Cross St., Finsbury, London, E. C.

Cross & Speirs Machine Co.,

When the joint passes the center is when the power comes in.



POWER

FOOT

DROP

Automatic m-bending wire.
Automatic m-working sheet

81 TO 37 CANAL STREET,
WATERBURY, CONN.

PRESSES.

PRESSES.

PRESSES.

chinery for
chinery for
metal.

LINK-BELT

ENGINEERING CO.
NICETOWN,
PHILA.
49 DEY ST.
NEW YORK.

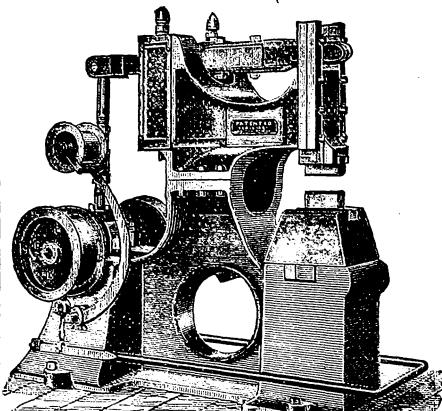
Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting, Dodge Chain, Howe Chain, &c.

General Eastern Agents for Fibre-Graphite Journal Bearings for shafting and machines. Require no oil or other lubricant. Moderate in price, durable and guaranteed. Bearings furnished to fit hangers now in use.

WESTERN CONNECTION

[CHICAGO.] LINK BELT MACHINERY CO.

JENKINS' POWER HAMMERS.



Adjustable and elastic stroke, nicety of regulation, efficiency of action, simplicity and durability of construction and the absence of leather straps, steel springs and all complication, combine to make this hammer the favorite wherever used.

JENKINS & LINGLE,
BELLEFONTE, PA.

Presses of all kinds for

SHEET METAL WARE.

Wiring, Blanking and Combination Dies a Specialty.

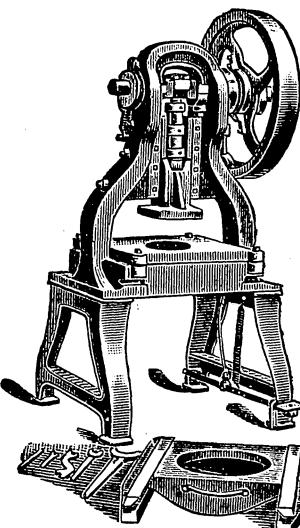
Just out. Special new machinery

FOR MAKING ROUND, SQUARE AND

CORRUGATED CONDUCTOR PIPE

In 10 Feet Lengths.

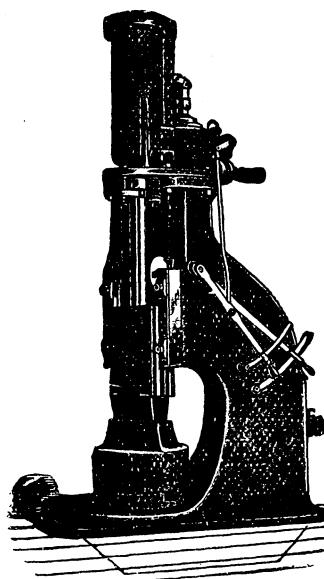
WILL TURN OUT 10,000 FEET PER DAY.



Stark Machine & Tool Co.,
BUFFALO, N. Y.



Handbook of Ornament. By FRANZ SALES MEYER. A grammar of art industrial and architecturally designing in all its branches, for practical as well as theoretical use. Authorized English edition. 580 pages, illustrated, cloth..... \$3.00
For Sale by David Williams, 96-102 Reade St., N. Y.



Bement, Miles & Co.,
PHILADELPHIA, PA.,

Builders of

Metal-Working Machine Tools

For railroad shops, locomotive and car builders, machine shops, steam forges, shipyards, boiler shops, bridge works.

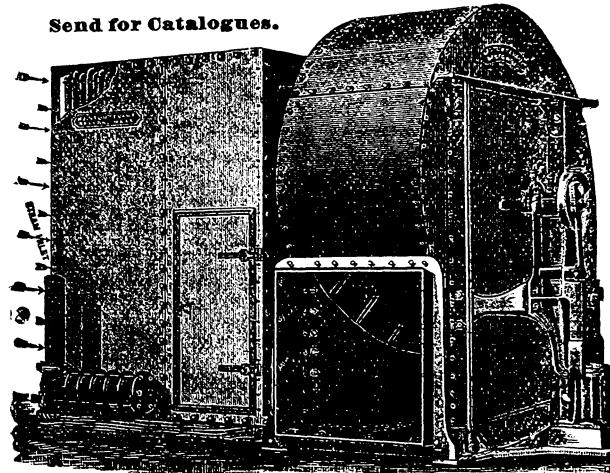
Steam Hammers for Working Iron or Steel.

NEW YORK OFFICE, Equitable Building.

GEORGE PLACE, Agent.

THE STURTEVANT SYSTEM OF HEATING AND VENTILATING

Send for Catalogues.

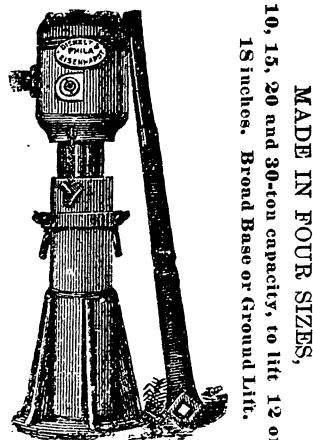


Manufacturing Establishments.

PRESSURE BLOWERS.
PORTABLE FORGES.

B. F. Sturtevant Co.
Boston, Mass.
91 Liberty Street,
NEW YORK.
16 South Canal St.
CHICAGO.
135 North Third St.
PHILADELPHIA.

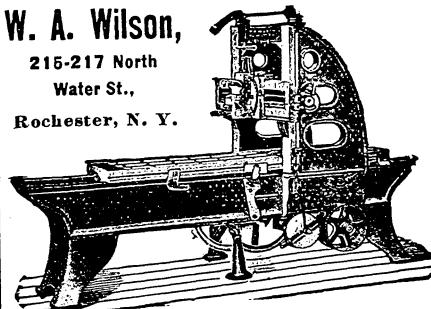
MADE IN FOUR SIZES,
10, 15, 20 and 30-ton capacity, to lift 12 or
18 inches. Broad Base or Ground Lift.
SUPERIOR TO ANY JACK NOW MADE.
Absolute in its action in any position.
Under complete and instantaneous control.



DIEBELT & EISENHARDT,
MAKERS,
1308 Howard Street, Philadelphia.

W. A. Wilson,

215-217 North
Water St.,
Rochester, N. Y.



Improved Iron Planers a specialty. 20 x 20, 22 x 22, 24 x 24 up to 42 x 42, to plane any length. Send for description and price-list before purchasing. Manufacturers' agent for other tools and machinery. Mention *The Iron Age*.

NEW HAVEN MANUFACTURING CO.,

New Haven, Conn.

Manufacturers of

Lathes,
Planers,
Drills,
Slotters,
ETC.

BUSINESS ESTABLISHED
1798.

INCORPORATED
1891.

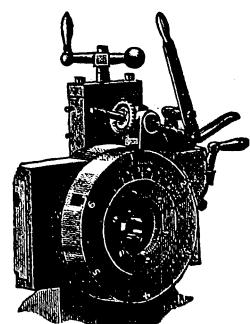
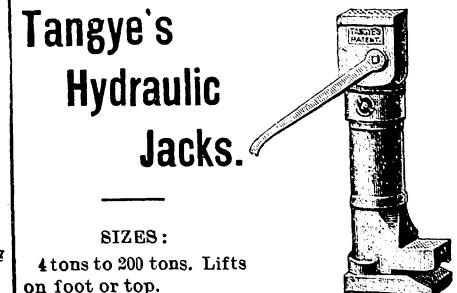
JOS. F. MCCOY CO.,
26 Warren St., New York,
HEADQUARTERS FOR

Hoisting
Crabs,
ALL IRON.

SIZES:
 $\frac{1}{2}$ ton to 70 tons.

Tangye's
Hydraulic
Jacks.

SIZES:
4 tons to 200 tons. Lifts
on foot or top.



Engravings Show the Style of Die
Head which the

Bignall & Keeler Mfg. Co.,

ST. LOUIS, MO.,

PLACE ON THEIR

PEERLESS AND DUPLEX

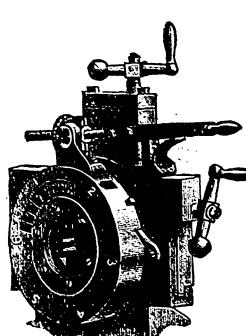
Pipe Threading & Cutting Machines.

Write for Prices on the

Most Perfect and Economical Line
of Machines on the Market.

Mention *The Iron Age*.

"Peerless" Head showing
dies expanded



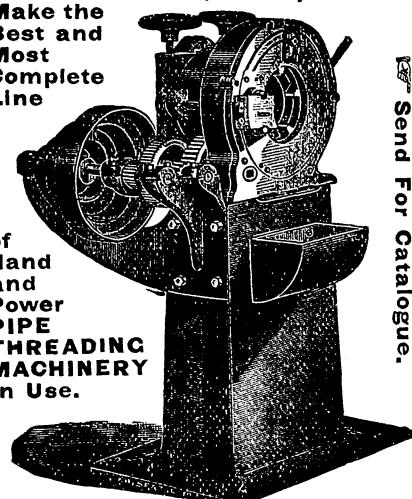
"Peerless" Head showing
dies closed.

The Merrill Manufacturing Co.

Toledo, Ohio,

Make the
Best and
Most
Complete
Line

of
Hand
and
Power
PIPE
THREADING
MACHINERY
in Use.



Send For Catalogue.



QUINT'S TURRET DRILLS.

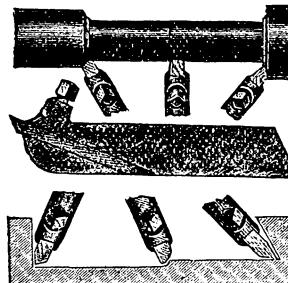
Six Spindle.

Drills from 1-32 to $\frac{1}{2}$ hole. Speed from 250 to 2000 rev.

Suitable for a large variety of work and is operated with ease and rapidity.

SEND FOR CIRCULAR.

A. D. QUINT, Harford, Conn.



Patented February 28, 1893.

The Armstrong
Tool Holder.
For General
Lathe and
Planer Work.
A practical sub-
stitute for
Forged Tools.
Saves forging
dressing, a 1%
tempering, a 70
per cent. grind-
ing, 50 per cent.
tool steel. Over
10,000 now in
use by such firms
as J. A. Farn-
ham Co., Fric-
kell Co., Morris
Machine Works, W.
P. Callahan &
Co., Walburn
Co., and many
others.

Swenson Co., Fitchburg Machine Works, Lodge & Shipley Machine Tool Co., and many other large concerns. Seven Sizes, suitable for all kinds of work. Tools sent on trial to responsible parties. Manufactured only by Armstrong Bros. Tool Co., 76-78 Edgewood Ave., Chicago.

D. SAUNDERS' SONS

MANUFACTURERS OF PATENT



PIPE CUTTERS

In three styles. **One Wheel and Roller Cutter.** **Three Wheeled Cutter** and the **Tool Cutter**, for cutting **Brass, Copper** and Wrought Iron **Tubes**. Also mfrs. of **Pipe** Cutting and Threading **Machines** $\frac{1}{4}$ in. to 16 in., Hand or Power.

Send for Catalogue to 27 ATHERTON ST., YONKERS N. Y.

Hand Punches and Shears

For Round, Flat, Square and Corrugated Iron.

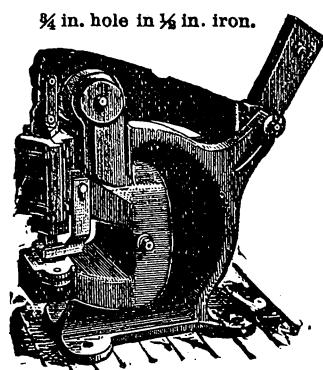
Portable Hydraulic Beam Punches,

(1 inch hole in 1 inch iron.)

Polishing and Buffing Machinery,

IMPROVED HYDRAULIC JACKS, to raise from 4 to 150 Tons.

Hydraulic Presses, all styles; Hydraulic Hand and Power Pumps; Accumulators, &c.



WATSON & STILLMAN,

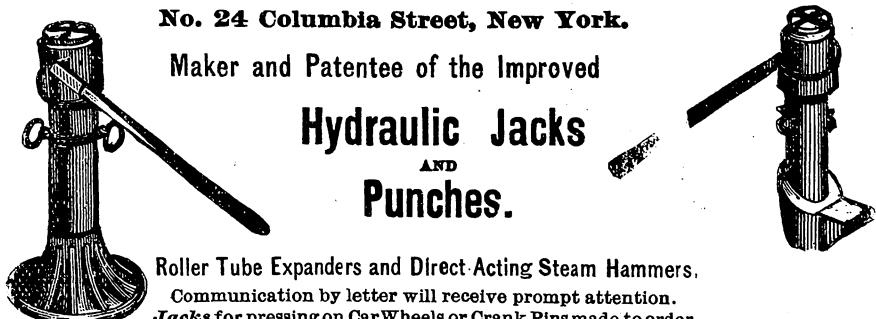
204, 206, 208, 210 E. 43d Street, New York.

RICHARD DUDGEON,

No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

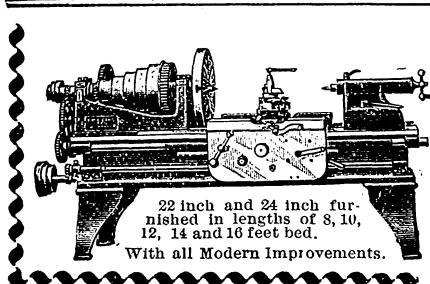
Hydraulic Jacks AND Punches.



Roller Tube Expanders and Direct-Acting Steam Hammers.

Communication by letter will receive prompt attention.

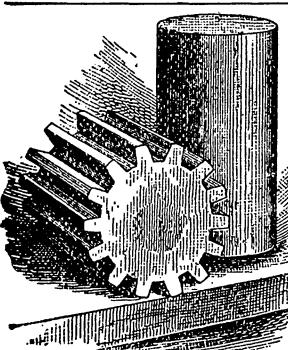
Jacks for pressing on Car Wheels or Crank Pins made to order.



22 inch and 24 inch furnished in lengths of 8, 10,
12, 14 and 16 feet bed.
With all Modern Improvements.

Eng. Lathes.

Our Patent
Radial Drills.



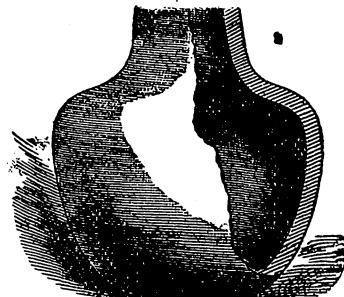
Billet and Patent Hot-Pressed
Steel Pinion

Hot
Pressed
Pinions.

Heavy Drawn Steel Work

Of Every Description.

Including Shapes for Centrifugals, Bottles for confining Gases, Chemicals, Quicksilver, etc., Heavy Tubing for Knitting Machines, Hydraulic Jacks and Presses, Air and Gas Receivers drawn from solid steel or plates, Straps, Wrists, Pins, Discs, Cups, Steel Flanges for high pressure steam, Drawn Seamless Steel Tubing for Bicycles, Boilers, including small diameter Tubing for use as hollow spindles, etc., etc.



Steel Bottles, any thickness or shape.

Hydraulic
Forgings.

THE UNITED STATES PROJECTILE CO.

1st Ave. and 53rd St., Brooklyn, N. Y.

Green River

Tire Shrinkers

(UPSETTERS).

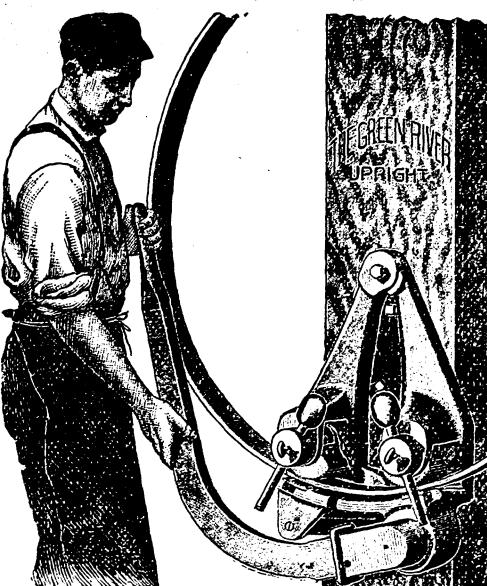
The Quickest, Most Simple and Best
Shrinkers made.

Also Tire Benders, Punching
Presses, Shoeing Vises, Swage Blocks,
Mandrels, Leveling Plates, Drilling
Machines, Bolt-Cutting and Nut-
Tapping Machines, Screw Plates,
Taps, Dies, Reamers, &c.

Send for 168-page catalogue.

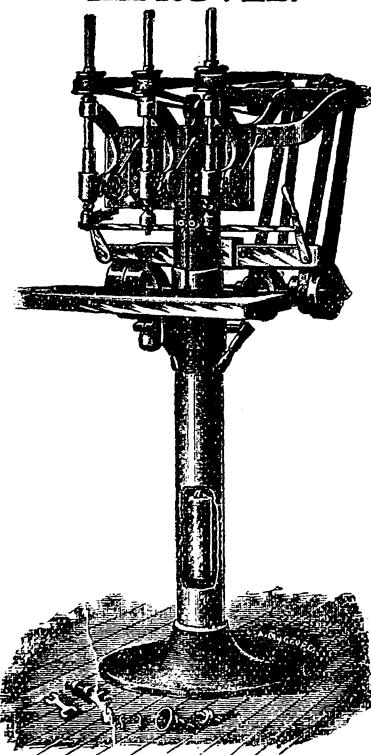
WILEY & RUSSELL MFG. CO.,

Greenfield, Mass., U. S. A.



SIGOURNEY DRILLS.

IMPROVED.

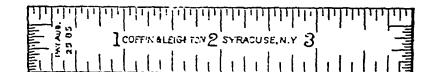


Sensitive, Strong and Interchangeable

One, Two and Three Spindles.

Counter-balanced Spindles and Tables. Vertical range of table, 30 inches, and it will swing to right or left.

SEND FOR CIRCULAR.

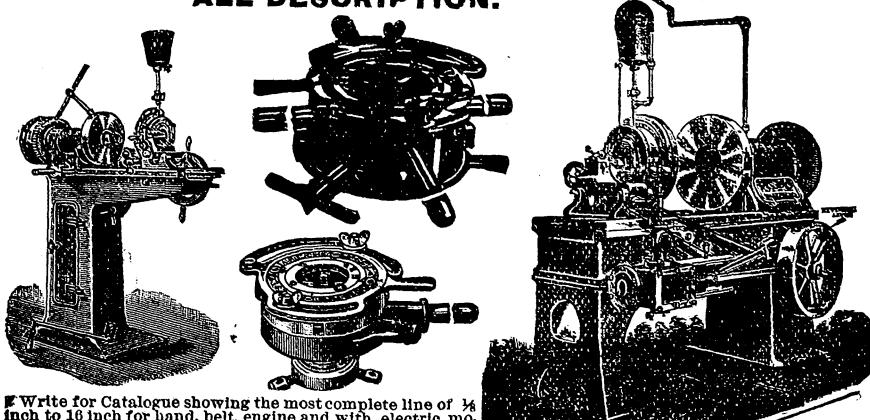
THE SIGOURNEY TOOL CO.,
Hartford, Conn.**MACHINISTS' SCALES,**
PATENT END GRADUATION.
Liberal Discount to the Trade. Send for List.

COFFIN & LEIGHTON, Syracuse, N. Y.

LARGE
DRILL PRESSES
MERS OF
THE LARGEST
VARIETY
SEND FOR NEW
30 PAGE CATALOGUE
JUST OUT
DWIGHT SLATE
MACHINE CO.
HARTFORD CONN.

JARECKI MFG. CO. (Limited), Erie, Pa.

PIPE THREADING AND CUTTING TOOLS OF
ALL DESCRIPTION.



Write for Catalogue showing the most complete line of $\frac{1}{2}$ inch to 16 inch for hand, belt, engine and with electric motor attachment.

We can furnish Bolt Threading Attachment for this Machine.

THE ARMSTRONG MFG. CO.,

Bridgeport, Conn.—

Pipe Threading
AND
Cutting-Off Machines.
Stocks and Dies,
Improved Hinged Vises, Pipe
Wrenches, Pipe Cutters, &c.
SEND FOR CATALOGUE.

NEW YORK OFFICE: 139 CENTREST.

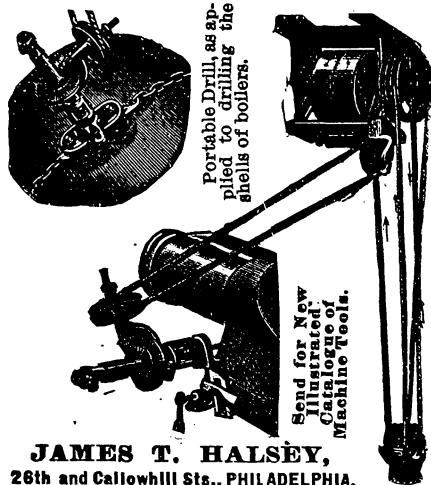
FRICITION CLUTCHES, SHAFTING, HANGERS, PULLEYS.

Sheaves for Rope Driving. Gear Wheels.

FRICITION PULLEYS.

KEYSTONE
CLUTCH AND MACHINE WORKS.

**1708-1710 Germantown Ave.,
PHILADELPHIA, PA.**



JAMES T. HALSEY,
26th and Callowhill Sts., PHILADELPHIA.



Portable Drilling and Tapping Machines.

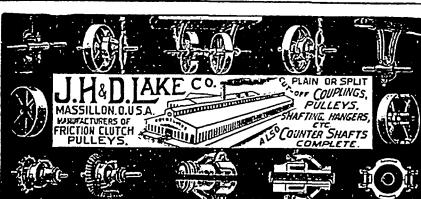
ALBERT M. COLBURN,
Wall St., New Haven, Conn.

Send for New No. 4 Catalogue.

REECE'S PATENT HAND BOLT CUTTER OR SCREW PLATE.



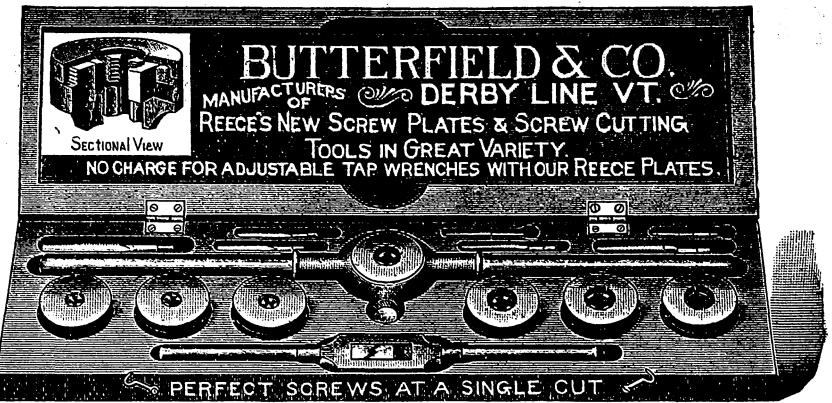
Send for new catalogue of
REW CUTTING TOOLS.
J. REECE, Mfr., GREENFIELD, MASS.



The Norton Drills

for light, sensitive and rapid drilling. 1, 2, 3, 4 or more spindles, sensitive or automatic feed. To drill from 0 to $\frac{1}{2}$ -inch holes. The latest and best. Most convenient, sensitive and durable drills on the market. Have balanced spindles and balanced tables. Write for prices and description, or for special machinery.

**THE
NORTON & JONES MA-
CHINE TOOL WORKS,
PLAINVILLE, CONN.**



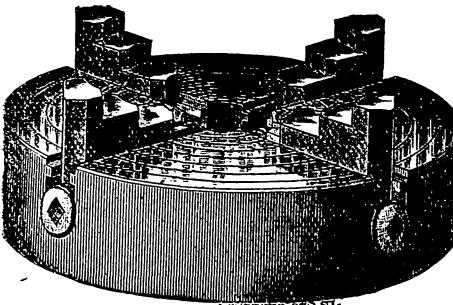
CUSHMAN CHUCKS.

We have recently improved our full line of Geared Scroll Chucks and have also added a 10 $\frac{1}{2}$ inch and a 15 inch. Prices and discount on application.

Send for our catalogue of all kinds of Lathe and Drill Chucks.

The Cushman Chuck Co., Hartford, Conn.

CHAMPION INDEPENDENT CHUCKS.



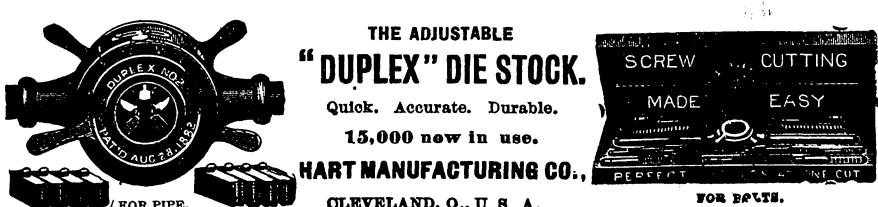
An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

THE D. E. WHITON MACHINE CO.



Three styles of Screw Plates **BUILT ENTIRELY ON HONOR**, with prices to suit all.
Write for catalogue.

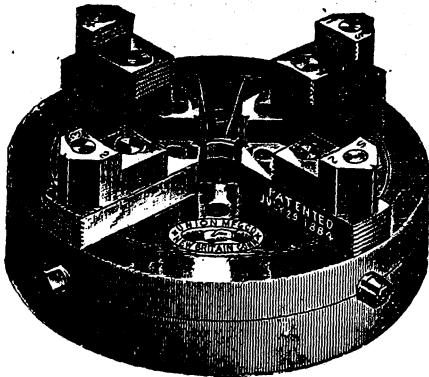
CHAMPION BLOWER & FORCE CO. - - - **LANCASTER, PA.**



UNION MANUFACTURING COMPANY, . . . NEW BRITAIN, CONN.

WAREHOUSE, 108 CHAMBERS ST., NEW YORK

Manufacturers of Combination Chucks, Universal Chucks, Independent Chucks, Combination Reversible Jaw Chucks, Car Wheel Chucks, &c., &c.



Union Chuck No. 21

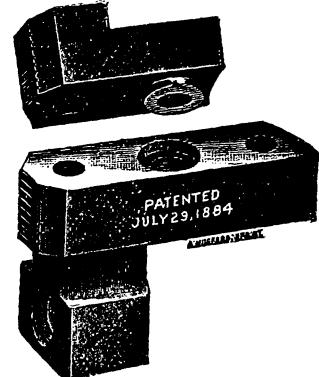
Combination with Reversible Jaws.

ALSO

Showing Sectional Cut of Jaw.

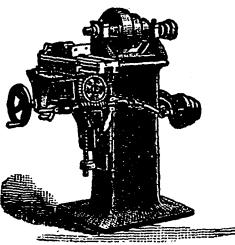
We guarantee our Chucks in every particular.

WRITE FOR CATALOGUE AND PRICE-LIST.



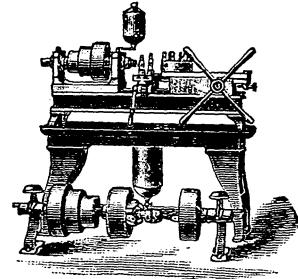
THE PRATT & WHITNEY CO.,

HARTFORD, CONN., U. S. A.,



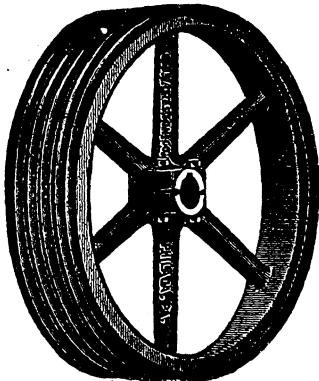
Manufacture forging and finishing machinery with dies, fixtures, milling cutters and gauges, for the manufacture, on the American system of interchangeability of parts, of fire arms, sewing machines and bicycles: Machines and tools for finishing brass in the forms of gas fixture joints and keys, locomotive fittings and plumbers' goods, as well as studs, screws and pieces of irregular outline of circular cross section in iron, steel and other metals. Manufacturers also of single and double head milling machines, used as substitutes for planers for heavy and rapid cutting in cast iron and steel. Circular milling machines for finishing grooves of sheave pulleys, faces and sides of large gear blanks.

ASK FOR "HARDWARE CATALOGUE."



GEO. V. CRESSON CO.,

18th STREET AND ALLEGHENY AVE.
PHILADELPHIA, PA.



ROPE WHEELS,

All Diameters and Number of Grooves, for Manilla, Hemp, Cotton, or Leather Ropes.

WE LEAD.

Sweetland Combination Chucks. Simple, accurate, original. Standard Independent Chucks, Solid Shell, Solid Reversible Jaws.

The Hoggson & Pettis Mfg. Co.,
New Haven, Ct.

Electric Traction on Railways and Tramways. By A. BEEKENZUHN. The author has endeavored in this book to summarize as concisely as possible the present state of electric traction and to describe the various methods and constructive details which are to-day in use or which have marked consecutive steps in the development of the art. 213 illustrations, 12mo, cloth.....\$4.00
For sale by David Williams, 96-102 Reade St., N.Y.

Wire Drawing Machines, WATERBURY Gang Slitters,

MACHINE CO.,
Power Presses and Dies, Waterbury, Conn.

Tumbling Barrels,

MANUFACTURERS.

Special Machinery.

Send For Prices.

STAY BOLT TAPS.

REAMER TAPER STRAIGHT SHANK

E * D * C * B * A

We Make a Specialty of this Style of Tap.

CUT THIS OUT, mark
Description of TAPS
used and send to us
for prices.

WELLS BROS. & CO.,

GREENFIELD,
MASS., U. S. A.

(ESTABLISHED 1854.)

A. & F. BROWN,

Engineers, Founders and Machinists.

SHAFTING,

PULLEYS, HANGERS, ETC.

FRiction CLUTCHES

Estimates and Plans furnished for transmitting power by

HORIZONTAL AND VERTICAL SHAFTING,

Also for erecting same.

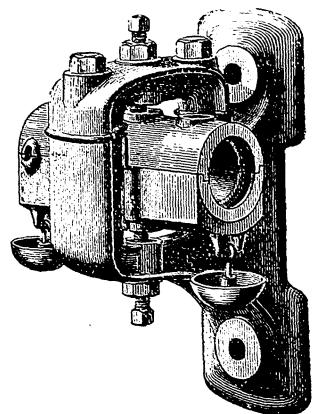
STEAM SIRENS

—FOR—

Lighthouse, Steamship, Factory and Fire Signals.

SEND FOR CATALOGUE.

17 DEY ST., - - - - - NEW YORK.



THE STANDARD TOOL CO., CLEVELAND, OHIO.

MANUFACTURERS OF

Increase Twist Drills, Reamers, Taps, Milling Cutters and Chucks.



Taper Shank
Drills,
St. Shank Drills,
Screw-driver
Bits,
Reamers,
Shell and Solid
Taper Reamers.



Bit Stock Drills for Metal or Wood.



Wood-Boring Brace Drills, will cut off nails.

Bearers in NEW YORK OFFICE, 33 CHAMBERS ST. Send for Catalogue

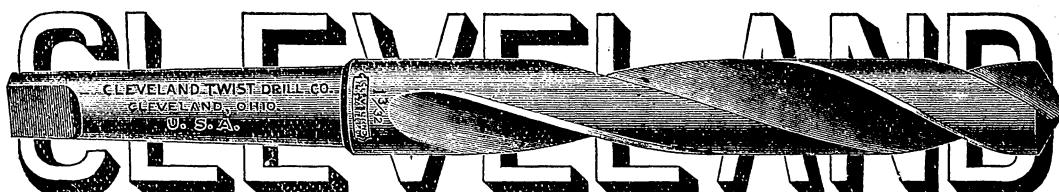
Hand Taps,
Mach. Screw Taps
"Standard" Drill
Chuck,
"Ellenwood" Drill
Chuck,
Sq. Shank Drills
for Ratchets,
Twist Drills for
Blacksmiths'
Presses Sockets for
Taper Shank
Drills.

1874.

OLD RELIABLE.

1894.

SEND



FOR

CATALOGUE.

WRITE

FOR

DISCOUNTS.

Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.

NEW PROCESS

TWIST DRILL COMPANY.

TAUNTON MASS.

They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.

STOW FLEXIBLE SHAFT,

Invented and
Manufactured by

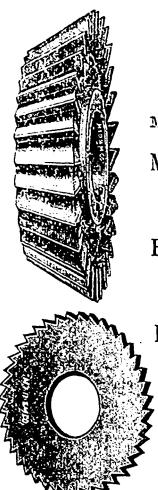
THE

STOW MFG. CO.,
Established 1875. Binghamton,
N. Y.
PORTABLE,
DRILLING
TAPPING,
REAMING.

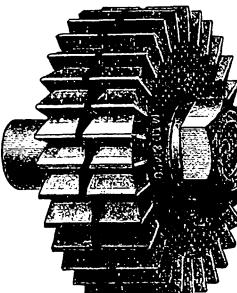
General European Agents,
SELIG SONNENTHAL & CO.,
85 Queen Victoria St., LONDON, ENGLAND.

Morse Twist Drill & Machine Co.,

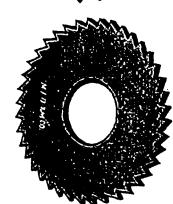
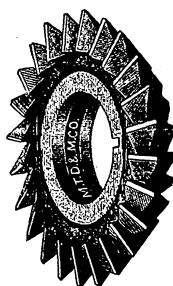
NEW BEDFORD, MASS.



Manufacturers of
Milling
Cutters,
Heading
Mills,
Interlocking
Mills,



Angular
Mills,
Slitting
Saws,
Screw
Slotting
Cutters,



And Mills of any shape and for any use.

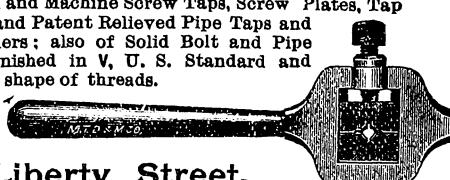
SEND FOR CATALOGUE.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



Manufacture of Patent Machine Relieved Nut, Hand,
Blacksmith and Machine Screw Taps, Screw Plates, Tap
Wrenches and Patent Relieved Pipe Taps and
Pipe Reamers; also of Solid Bolt and Pipe
Dies. Furnished in V, U. S. Standard and
Whitworth shape of threads.



NEW YORK.

Stow Flexible Shaft Co., Limited,

26th, Callowhill & Biddle Sts

PHILA., PA.,

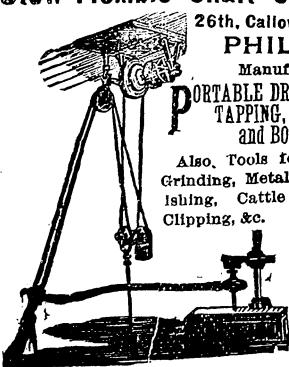
Manufacturers of

PORTABLE DRILLING,
TAPPING, REAMING
and BORING MACHINE

Also, Tools for emery Wheel
Grinding, Metal and Wood Pol-
ishing, Cattle Brushing, and
Clipping, &c.

Gen'l European
Agents.

Bolling & LOWE,
2 Lawrence,
Pountney Hill
LONDON, ENG.



HAVE YOU EVER HEARD OF

PAT. SEP 22 74
FEB 23 86

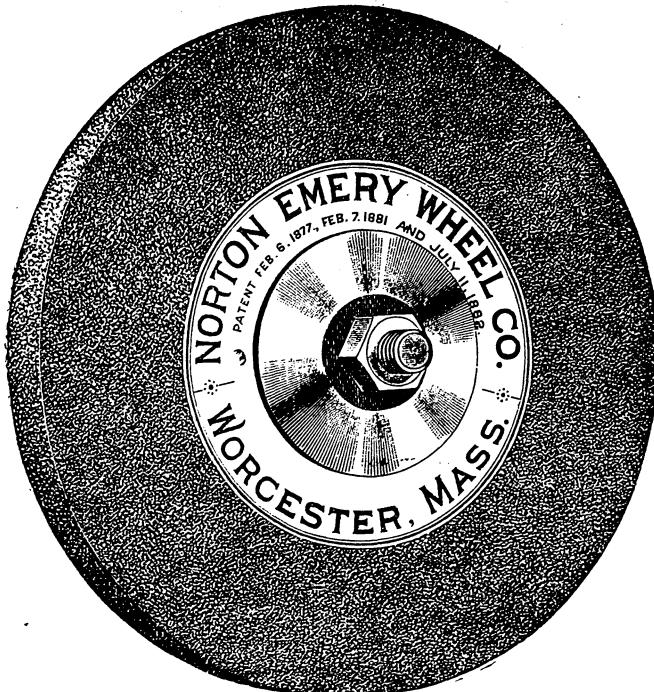
THE WONDERFUL FORSTNER AUCER BIT?

If not, it will pay you to send for a sample 4-8 bit and price-list. Sent on receipt of 56 cents. It will bore Round, Oval and Square Holes, and cannot be equaled for fine carpentry, cabinet or pattern work. Discount to dealers on application.

FOR SALE BY ALL HARDWARE DEALERS.

THE BRIDGEPORT GUN IMPLEMENT CO.,
313 and 315 Broadway, New York

Norton Emery and Corundum Wheels.



Complete Illustrated CATALOGUE mailed FREE on application.

ESTABLISHED 1867.

CAPITAL \$100,000

Northampton Emery Wheel Co.,

LEEDS, MASS.

And 20 South Canal St., Chicago,

MANUFACTURERS OF

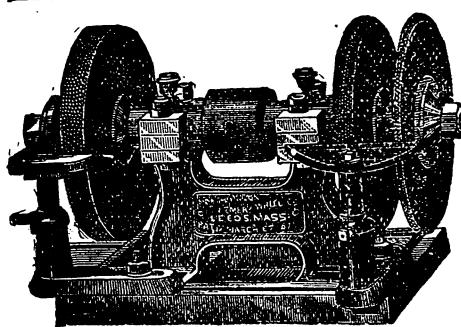
EMERY WHEELS

AND

EMERY WHEEL MACHINERY

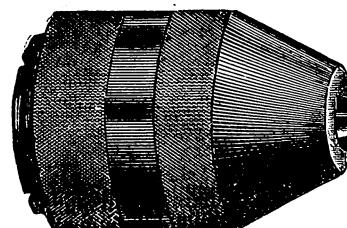
Of Best Quality.

Send for Catalogue. FACTORY AT LEEDS, MASS.



THE Bennett Emery Wheel Dresser

BENNETT NO. 1
PAT. APR. 15, 1890.
Does the best work, does it easy, quick and the most for the least money. Manufactured by Bay State Stamping Co., 17 Hermon Street, Worcester, Mass.



THE NEW GIANT DRILL CHUCK.

Holds a Drill With the Grip of a Giant. All Steel Parts Interchangeable.

SIMPLE IN CONSTRUCTION.

EASY TO TAKE APART AND CLEAN. BEST OF WORKMANSHIP AND VERY CHEAP. Manufactured and sold by

THE SMITH & EGGE MFG. CO., Bridgeport, Conn.

SPECIAL OFFER.

On account of changes in the sizes of our Screw Machines, we have decided to close out all our present stock of late model machines at a price 10 per cent. better than our Regular Discounts:

We have for Immediate Delivery:

1 No. 3 Screw Machine, with Geared Friction Head and Power Feed.

1 No. 3 " " " " " Wire Feed.

1 No. 3 " " " " " Power Feed, Wire Feed and extra large

Hollow Spindle.

1 No. 3 Screw Machine with Plain Head.

1 No. 3 Turret Lathe, with Geared Friction Head and Wire Feed.

The following are partly finished, and will be furnished with or without Power Feed or Wire

Feed:

7 No. 3 Screw Machines, with Geared Friction Head.

5 No. 3 " " " Back Geared Head.

2 No. 3 " " " and extra large Hollow Spindle.

Write for Photograph, Description and Price.

THE GARVIN MACHINE CO.,

Laight and Canal Sts., NEW YORK.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York

A POINTER



To SAVE you FREIGHT We keep in stock everything in the grindstone line at our branch yards, Chicago, Ill., Boston, Mass., and 283 Front Street, New York.

Send for Catalogue D.

**The Cleveland Stone Co.,
CLEVELAND, OHIO.**

Patent ROCK EMERY MILL STONES.

Next to Diamonds in Hardness and Durability. Made to Fit Any Mill Frame without change.



Cuts every substance with unexampled rapidity; always sharp; emery face Never Dressed. As much more Durable than other stones as they are Harder. Never Glaze; grind everything. Most Rapid Grinder known.

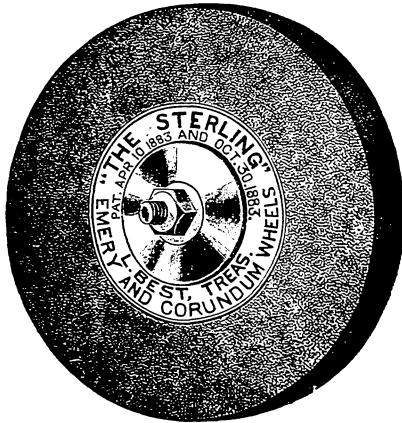
Send for Circular.

STURTEVANT MILL CO., Boston, Mass.

Sterling Emery Wheel Company, 174 Fulton St., N.Y.

FACTORIES:

Tiffin, Ohio, and West Sterling, Mass.



E. Harrington, Son

& Co., Incorporated.

ESTABLISHED 1867.

MANUFACTURERS

Engine Lathes, Drills, Planers, &c.

Double Chain Screw Hoists

Geared Travelers and Turntables.

Gear Cutting a Specialty.

1508 Pennsylvania Ave.,
Philadelphia, Pa.

Alfred Box & Co.,

Front, Poplar and Canal Sts., Philadelphia.

SOLE MANUFACTURERS OF

BOX'S PAT. DOUBLE SCREW HOISTS

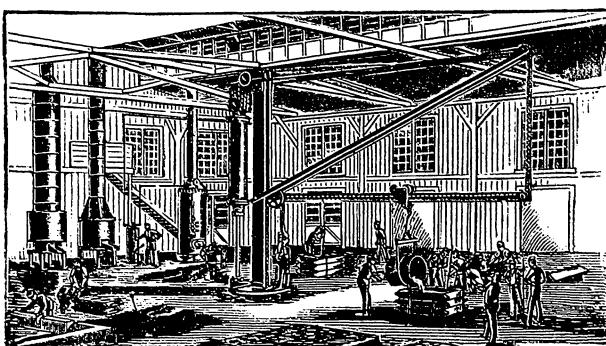
25,000 supplied in the United States exclusive of foreign trade; a record that tells its own story; a record of solid, substantial growth; extensive new works necessary to keep up with orders in our specialties; ample room now to build the heaviest class of Traveling and Jib Cranes of all sizes, Overhead Railways, Trolleys, Special Hoisting Gear for home-made Cranes; also our Patent Radial Drills and Gang Drills, as used by bridge builders. Estimates furnished with photos. Correspondence solicited, or visit our works.

All We Ask.

USERS.

The Largest and Best Concerns.

Frazer & Chalmers.
Gaar, Scott & Co.
J. I. Case Threshing Machine Co.
Colorado Fuel & Iron Co.
Solid Steel Co.
Sterling Boiler Co.
Otis Bros. & Co.
Geo. V. Cresson Co.
Pittsburgh Steel Casting Co.
Eynon-Evans Mfg. Co.
Harrison Safety Boiler Co.
Hoopes & Townsend
Hughes & Patterson.
Shickle, Harrison & Howards Iron Co.
Rensselaer Mfg. Co.
Buffalo Cast Iron Pipe Co.
Buffalo Furnace Co.
National Pipe & Foundry Co.
John Brennan & Co.
Murray Iron Works.
Danville Foundry & Machine Co.
Sears & Nicols.
Moore & Brady.
Pearson & Co.
Morton Reed & Co.
Benj. Atha & Illingworth Co.
Montgomery Furnace Co.
John Q. Denny.
I. G. Johnson & Co.
Canda Mfg. Co.
Crane & Breed Mfg. Co.
Diamond State Iron Co.
Hartman Mfg. Co.
Blankley Bros. & Co.
Port Henry Furnace Co.
Wm. L. Bailey & Co.
Akron Iron Co.
And others.



5-ton Ridgway Crane in Foundry Diamond State Iron Co., Wilmington, Del.

IDEAL CRANE FOR FOUNDRY OR MILL.

Rapid, Safe, Sure and not costly. No pumps, no accumulator, no shocks, no bother with valves and packings. None of that awful waste of power. No freezing. No bother of any sort.

Attached to any steam supply it is ready for business at once. Uses so little steam it is never missed. No special operator required. Absolutely safe. Being balanced it is easy on buildings. Sets indoors or outdoors. So cheap any plant can use it. Earns its cost always in a few months.

The best concerns everywhere are getting them. Look each side of you. Some have eight or nine or more of them. They save dollars in handling goods; that's the reason. Does the work while other cranes are getting ready to do it.

We make many styles—also Elevators.

SEND FOR CIRCULAR.

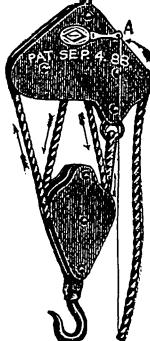
CRAIG RIDGWAY & SON,
COATESVILLE, PA.

USERS.

The Largest and Best Concerns.

Penna. Steel Co.
Illinois Steel Co.
National Tube Works Co.
Phoenix Iron Co.
Henry Diston & Sons Co.
A. & P. Roberts Co.
Catasauqua Mfg. Co.
Mahoning Rolling Mill Co.
Harrisburg Rolling Mill Co.
New Phila. Iron & Steel Co.
Old Dominion Iron & Steel Co.
Standard Iron Co.
Cambria Iron Co.
Johnson Co.
Norristown Steel Co.
Midland Steel Co.
Kellogg Seamless Tube Co.
American Steel Wheel Co.
Benwood Steel Co.
Bellaire Nail Works.
Oliver Iron & Steel Co.
Jones & Laughlin.
West Superior Iron & Steel Co.
Nova Scotia Iron & Forge Co.
Reading Iron Co.
Spang Steel & Iron Co.
Apollo Steel & Iron Co.
Glasgow Iron Co.
Harrisburg Car Co.
Atlantic Refining Co.
W. W. Kurtz & Sons.
Kilmer Mfg. Co.
J. W. Friend & Co.
American Wire Nail Co.
New Haven Wire Co.
E. & G. Brooke Iron Co.
Passaic Rolling Mill Co.
Moorehead-McClean Co.
And others.

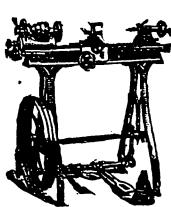
SELL THE BEST.



THE "SURE GRIP"
Steel Tackle Block
is taking the place of all
other hoisting blocks.

Send for catalogue and discount.

Fulton Iron & Engine Works,
28 Brush St., Detroit, Mich.
ESTABLISHED 1852.
—OR—
Rice Lewis & Son, Ltd.,
TORONTO, CAN.



Foot & Hand Power Machinery

Screw Cutting Lathes, Wood Turning Lathes, Scroll Saws,
Circular Saws, Moulder, Mortisers, Etc.

Strictly High Grade. Catalogue Free.
SENECA FALLS MFG. CO.,
255 Water St., Seneca Falls, N. Y., U. S. A.

London Agency, MESSRS. CHAS. CHURCHILL & CO., 21 Cross St.,
Finsbury, London, E. C., England.



UPRIGHT
UNIVERSAL AND RADIAL DRILLS, BORING
AND TURNING MILLS, ALL SIZES.
BICKFORD DRILL & TOOL CO.,
10 Lawrence Street, Cincinnati, O.



LATHES.

ISRAEL H. JOHNSON, JR. & CO., - PHILADELPHIA.

LATHES,
MODERN DESIGNS. CAT. FREE.

PLANERS, SHAPERS, DRILL TOOLS.
Workmanship, Material, &c., Best. Prices Low.
SEBASTIAN LATHE CO., 113 & 115 Culvert St.
CINCINNATI, O.

The Goddard and Columbia
Blacksmiths' Drills
ARE THE
BEST.
Send for
Catalogue.

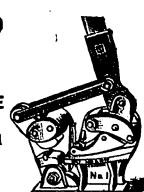
ASA GODDARD
Manufacturer
Worcester, Mass.

B. & O. SURE GRIP
TIRE UPSETTER.

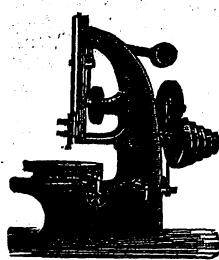
IT IS WITHOUT A FAULT. ONE
MOTION DOES IT ALL.

Every machine is tested and
warranted. Send for Price.

BUTTS & ORDWAY.
500 Atlantic Ave., Boston, Mass.



Engine Room Chat. By ROB. GRIMSHAW. This little book presents in colloquial style ideas which, appeal to all interested in the generation of power, more particularly those charged with the care of engines and boilers and their appurtenances. 148 pages, cloth, \$1.00.
For sale by DAVID WILLIAMS, 96-102 Reade st., N Y



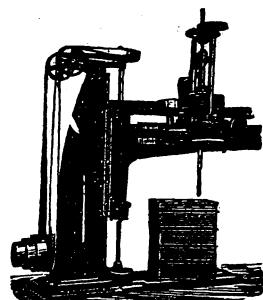
William Sellers & Co., Inc.

PHILADELPHIA, PA.,

—MANUFACTURERS OF—

Improved Machine Tools for Working Iron and Steel,
High Speed Power Traveling and Swing Cranes,
Injectors, Locomotive Turn Tables, Shafting, &c., &c.
Testing Machines, under patents of A. H. Emery.

Prices, Descriptive Matter, &c., Furnished on Application.



**MORSE,
WILLIAMS
& CO.**

Morse Elevator Works.

MANUFACTURERS AND BUILDERS OF
ELECTRIC, HYDRAULIC, BELT and HAND
POWER PASSENGER and FREIGHT
ELEVATORS.

1105 Frankford Ave., Philadelphia. 108 Liberty St., New York.
1116 E. St., N. W., Washington, D. C. 33 Lincoln St., Boston.
425 Spruce St., Scranton, Pa. 82 Church St., New Haven.
Omaha Building, Chicago, Ill.

FAIRMOUNT MACHINE CO.,

(Successors to Thomas Wood & Co.)

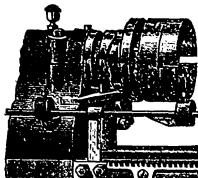
Twenty-second and Wood Sts., Philadelphia, Pa.

Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

Rope Transmission ; Sheave Wheels, any size required, for Hemp, Manila and Cotton Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring &c.

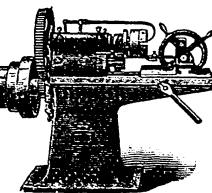
ADAMS

Automatic Bolt-Threading & Nut Tapping Machine



Made in all Sizes to Cut from 1-4 in. to 6 in.

The simplest and most durable machine in existence. The threading head is made entirely of steel. No links, levers, springs, caps, cases, blocks or die rings in or about the head. Separate Heads and Dies Furnished. Write for descriptive circular and price-list to



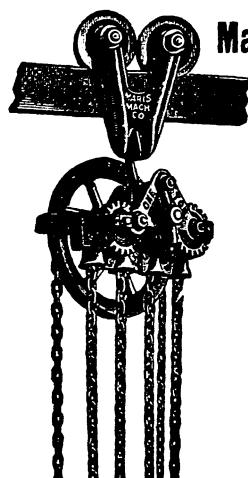
DETTRICK & HARVEY MACHINE CO.,
Engineers and Machinists, BALTIMORE, MD.

MANUFACTURERS OF
THE OPEN SIDE IRON PLANER.

KEEP POSTED

and you will know what is going on. Possibly you do not need a cutting-off machine just at present, but if you use one or ever expect to need one, you ought to know about the latest improvements, and we are the ones to tell you. We have some new tool blocks, an accelerated speed device and other things we would like to show you. Perhaps you have one of our machines ; then you certainly should examine our latest style. We shall be only too glad to send you our circulars, list of users, photographs and prices. We hope you will feel interested enough to drop us a postal.

HURLBUT-ROGERS MACHINE CO., So. Sudbury, Mass.



Maris & Beeckley.
PHILA., PA.

MANUFACTURERS OF

CRANES,

Power Bridge
Cranes, Hand
Bridge Cranes,
Jib Cranes.

Portable Hoist.
Holds load at any
point.

Overhead Track,
Trolleys,
Switches.



J. G. SPEIDEL,
807 & 809 CHERRY STREET,
READING, PA.

Patentee and Manufacturer of the
celebrated

Economic Safety Hoist.

500 to 30,000 Lbs. Capacity.
Has been awarded the John Scott Medal and Premium by the Franklin Institute of the City of Philadelphia for Highest Efficiency, Simplicity and Durability.
One man can lift two to three times as fast as with any other self-holding chain hoist. It has two speeds, is built strong and durable, and guaranteed to give satisfaction.

TRAVELING AND SWING CRANES up to 30,000 lbs. capacity and 50 ft. span.
Overhead Tramway, with Trolleys, Switches, &c., Elevators and Special Hoisting Machinery. Illustrated Cat. and Prices on application.



Moore Mfg. & Fdry. Co.,

Milwaukee, Wis., U. S. A.

Manufacturers of

Moore's Anti-Friction

Differential

Chain

Pulley

Block.

A New Movement!
A Perpetual Compound Lever!
Powerful, Simple and Durable!

One Man Can Lift to the Full Capacity of the Block.

Self-Sustaining at Any Point.

The Block Always Hangs Plumb.

Send for descriptive price list,
mentioning this paper.

BONNELL'S NUBIAN

NUBIAN BUNNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN

\$100

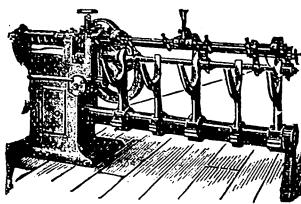
BONNELL'S NUBIAN

Per thousand words is what Robt. Louis Stevenson gets for his stories. The difference twixt Bob and us is that we pay more than that from you? Do you know that BONNELL'S NUBIAN IRON ENAMEL is the best black on earth for all Iron Work? Write us just a postal card and get our story and the next issue of our quarterly calendar.

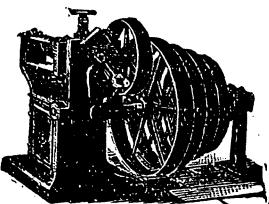
77 Warren St., New York, N. Y.
Hall & Carpenter, Philadelphia.
Taylor Goodrich, San Francisco.

33-35 Nubian Ave.,
CRAGIN, ILL.

NUBIAN BUNNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN

THE NUBIAN IRON ENAMEL CO.,

Automatic Wire Straightening and Cutting Machine.



Automatic Wire Straightening and Cutting Machine.

JOHN ADT & SON,

NEW HAVEN, CONN.

BUILDERS OF

Machinery for Hardware Manufacture.

BUTT MILLING MACHINERY,

BUTT DRILLING MACHINERY, RIVETING MACHINES, WIRE STRAIGHTENING MACHINERY, FOOT PRESSES,

SPRUE CUTTERS, ETC.

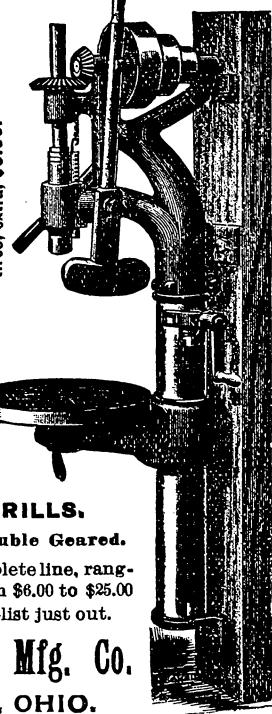
Silver's Power Post Drill.

FIG. 727.

Has OUT GEARS, and is a thoroughly first-class tool in all respects. Dia. Column, 4½ in.; Dia. Spindle, 1 3-16 in.; and bored No. 2 Morse taper. Vertical Travel, 6 in.; Drills to centre 18 in. circle.

Weight, 325 lbs.; Price, \$60.00.

Wheel holding attachment for drilling tires, extra, \$15.00.

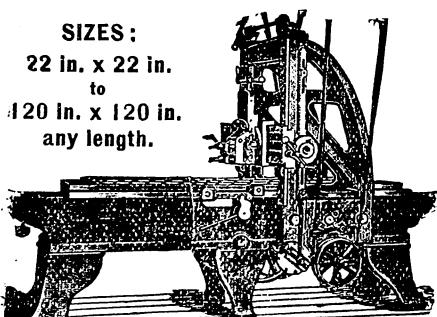
**HAND DRILLS.****Single and Double Geared.**

Large and complete line, ranging in price from \$6.00 to \$25.00 Net. New price-list just out.

The Silver Mfg. Co.
SALEM, OHIO.

THE POWELL PLANER CO.

SIZES:
22 in. x 22 in.
to
120 in. x 120 in.
any length.



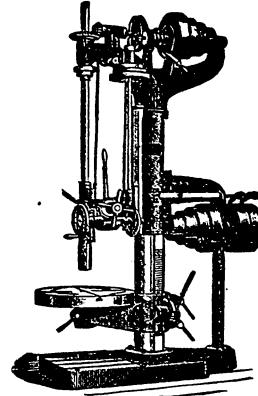
WORCESTER, MASS.

PAPER MACHINERY
FRICITION CLUTCHES

THE MOORE & WHITE CO.
15TH & LEHIGH AVENUE

THE Tool Room

Or Machine Shop without proper machinery for keeping old tools in repair and the making of new ones cannot hope to succeed. The Hamilton Drill Press is a necessary adjunct to all such, because it does all that a tool of this kind can do, and besides, it's built on honor.

**THE HAMILTON MACHINE TOOL COMPANY**

WEST MARKET STREET,

Hamilton, - Ohio, U. S. A.

PULVERIZE — PULVERIZE — PULVERIZE**THE GRIFFIN MILL.**THE ONLY PERFECT
PULVERIZER

of Quartz, Gold or Silver Ores, Portland Cement, Phosphate Rock, Foundry Facings and all other Refractory Substances. Will work wet or dry. Correspondence solicited. Illustrated pamphlet free.

BRADLEY FERTILIZER CO.,
92 State Street, - BOSTON, MASS.

PULVERIZE — PULVERIZE — PULVERIZE**CRUCIBLE STEEL CASTINGS.**

Why send your PATTERNS EAST and WAIT FOUR WEEKS for your CASTINGS when you can get

SOLID STEEL CASTINGS

at home PROMPTLY? Answer

THE KING & ANDREWS CO.,

No. 218 N. Union Street, CHICAGO, ILLS.

FOR NUMBERING AND LABELING
Boxes, Drawers and Shelves

In Hardware Stores and Factories.

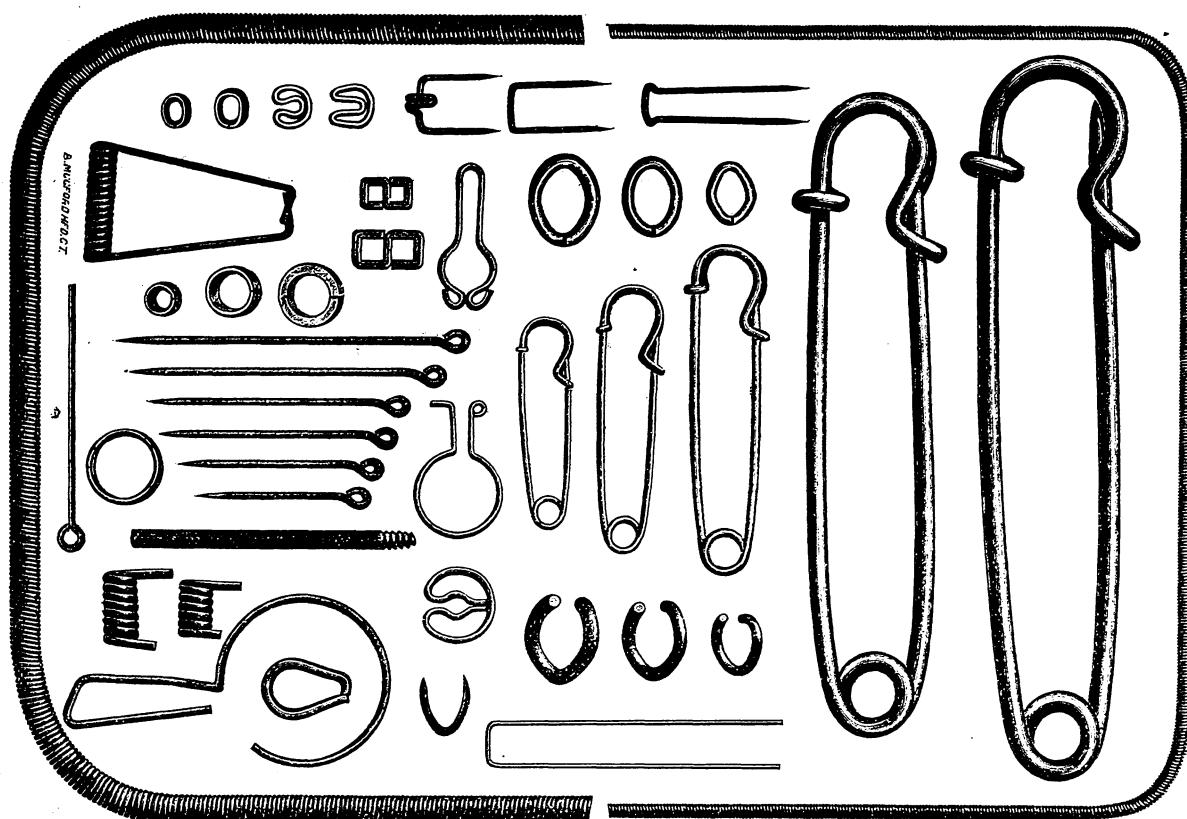
Send for sample and description of our Handy Box of small gummed Letters and Figures, intended for labeling shelf boxes. Put up especially for the Hardware trade.

THE TABLET AND TICKET CO., Mfrs.
57-59 Franklin St.
Chicago.

99 Franklin St.,
New York.

WILLSON'S
PAPER
LETTERS

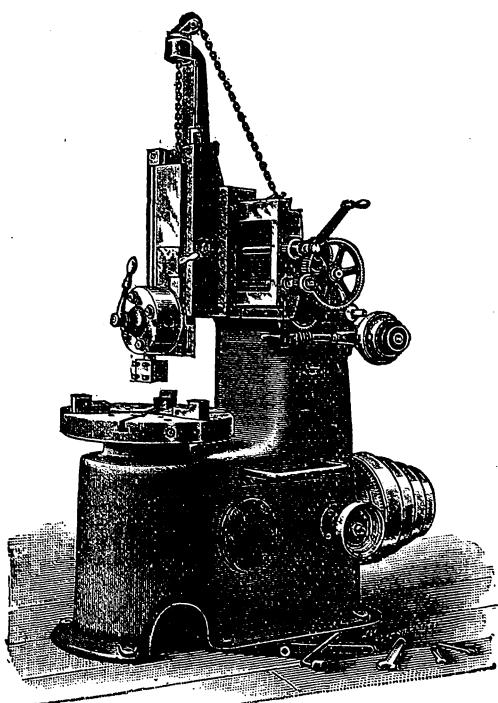
SAMPLES (FULL SIZE) OF WORK MADE BY

SPECIAL AUTOMATIC MACHINES

MANUFACTURED BY

The E. J. MANVILLE MACHINE CO., Waterbury, Conn.**SOMETHING NEW.**

**30 Inch Vertical Chucking and Facing
Machine, with Back Gears.**



Capacity, 30 inches in diameter and 14 inches in height, under the rail.

Table is 24 inches in diameter and has a universal chuck.

Feeds are automatic in all directions and are provided with trips.

Countershaft has one 16-inch and one 20-inch pulley, giving 16 changes of speed, 8 with cone and 8 with back gears.

Let Us Send More Complete Information.

BRIDGEPORT MACHINE TOOL WORKS,

E. P. BULLARD, Prop., - Bridgeport, Conn.

N. Y. OFFICE, 39 Cortlandt Street, Room 86.

BARGAINS.

24 x 48 Miller & Allen Corliss Engine.
16 x 36 Slide Valve Engine.
16 x 24 " " New.
15 x 30 " " "
15 x 18 " " "
14 x 30 " " "
12 x 20 " " New.
14 x 20 Vertical "

A large number of new and second-hand Boilers, Engines, Lathes, Planers, Shapers, Millers, &c., in stock.

Write us for what you want and we will give you prices and full information.

LOVEGROVE & CO.,
Third and Quarry Sts., Phila., Pa.

SECOND-HAND MACHINERY.

One Fifield Screw Cutting Engine Lathe, 30 in. swing on 16 ft. bed, with blocks to raise same to swing 47 in.
One Fifield Screw Cutting Engine Lathe, 38 in. swing on 14 ft. bed.
One Pratt & Whitney 36 in. Gap Chucking Lathe.
One Pease Planer, 24 in. x 24 in. x 6 ft.
One Iron Planer, 52 in. wide, 44 in. high, 12 ft. long, with two heads on the cross rail.
One L. W. Pond Gear Cutter, to cut gears 36 in. diameter, 5 in. face, also arranged for cutting bevels.

HILL, CLARKE & CO.,
156 Oliver St., Boston, Mass.
12 and 14 South Canal St., Chicago, Ill.

SECOND-HAND MACHINERY.
1 Iron Planer 60 in. x 60 in. x 20 ft., 2 heads on Cross Rail.
1 Iron Planer 34 in. x 26 in. x 7 ft., 1 30 in. x 30 in. x 8 ft.
1 Iron Planer 24 in. x 24 in. x 4 ft., 1 32 in. x 25 in. x 8 ft. 8 in.
1 Iron Planer 16 in. x 12 in. x 8 ft., 1 20 in. x 20 in. x 5 ft.
1 Engine Lathe 48 in. x 16 ft., raised to 60 in., Putnam make.
1 Engine Lathe 38 in. x 14 ft., Putnam make.
1 " 37 in. x 17 ft., D. W. Pond make.
1 " 26 in. x 10 ft., " "
1 " 24 in. x 25 ft. 6 in., A. 1 24 in. x 14 in., New Haven.
1 Engine Lathe 20 in. x 12 ft., New Haven. 1 18 in. x 8 ft., New Haven.
1 Drilling Machine 40 in., B. G. S. F. 1 36 in., B. G. S. F., both New Haven.
1 Drilling Machine 30 in., R. G. Gould.
1 13 in. Shaping Machine, Gould.
1 McDougal & Potter 9 in. x 24 in. Steam Hammer.
1 600 lb. Merritt Drop Friction.
1 425 in. Peck Lift " Geared.
All kinds of Iron and Wood Working Machinery.
Lists sent. NEW YORK MACHINERY DEPOT,
Office 178 Broadway, N. Y.

Trustee's Sale of Machine Shop Equipment

Lathes, 52 in. swing, 41 ft. bed; 30 in. swing, 22 ft. bed. One Pit Lathe. Drills, 38 in. upright, 5 ft. post drill, Horizontal Drilling Machine. Engines, 5 new and 7 second-hand, from 100 H.P. down. Cranes, 15 ton Gil Crane, 30 ft. high; 12 ton Gil, 18 ft. high. Building, extra heavy timbered, 70 ft. span, 100 ft. long, fit to remove, two storied, iron clad. Hundreds of Iron Pulleys and Fly Wheels, Hangers and Shafting. Address

W. A. BOLE, Trustee,

Liberty Ave., cor. 25th St., Pittsburgh, Pa.

A DOUBLE CUTTING

Paper Roll Cutter.

Patent just issued and for sale. Cuts the Paper both ways. Adjustable to any width. Paper. Requires no rod to hang roll in cutter. Made partly of wood and iron or all iron. Copy of Patent sent on application. Address

THOMAS GASKINS,
Arcadia, DeSoto Co., Florida.

FOR SALE.

One 25 H.P. Otto Gas Engine in first-class condition. Can be bought very reasonable. BIRMINGHAM IRON FOUNDRY, Birmingham, Conn.

Cinder Cars.

Ten 30 in. gauge iron Cinder Cars, bodies 5 1/2 ft. long x 4 ft. wide at floor and 5 ft. long x 3 1/2 ft. wide at top x 18 in. deep. Arranged to dump at forward ends. They are complete and in good running order. Price very low.

THOS. P. CONARD,
206 Walnut Place, Philadelphia.

2 Rolling Mill Engines

AT 1c. PER POUND.

32 in. x 32 in., 25 ton wheel.
36 in. x 32 in., 25 ton wheel.
Shafts 16 in. in diameter, 12 feet long.
Rolling Valve, Pickering Governor.

These are good, strong, serviceable engines and are only offered at the above price until sold or removed, which they must be by May 15th.

MARVIN BRIGGS,
12 Broadway, New York.

One 125 H.P. Armington & Sims Automatic Engine.
Two 125 H.P. Phoenix Automatic Compound Engines.
One 89 H.P. Beck Automatic Engine.
One 69 H.P. Westinghouse Automatic Engine.
10, 20, 30, 40 and 50 H.P. Automatic Engines.
100, 200, 300 and 500 H.P.-Berryman Feed Water Heaters.

All the above in first-class condition and cheap.

FRANK T. O'MEY,
131 N. Third St., Philadelphia, Pa.

SECOND-HAND RAILS FOR SALE.

In lots to suit and ready for shipment.

50 tons 20 lb. Iron T rails.
150 tons 25 lb. Iron T rails.
210 tons 30 lb. Steel T rails.
120 tons 30 lb. Iron T rail.
300 tons 35 lb. Iron T rails.
250 tons 50 lb. Steel T rails.
400 tons 54 lb. Steel T rails.
1700 tons 66 lb. Steel T rails.
2200 tons 68 lb. Steel T rails.
800 tons 70 lb. New Seconds Steel.
800 tons Johnson Girder Rails, 38, 47 and 52 lb.

All in excellent condition and selected. Sound rails of all sizes cut to specified lengths for builders' use, foundations, vaults, kilns, &c. Apply to

JOSEPH JEWKES, Steel Rails,
Pittsburgh, Pa.

AT ALL TIMES

we have on hand Steam Pumps, Second-hand and New. Every Second-hand pump is tested and guaranteed before leaving shop. Write us for information, also for catalogue, circulars, prices, etc., of the celebrated "Hooker Patent Steam Pump," which we manufacture.

HOOKER-COLVILLE STEAM PUMP CO.,
St. Louis, Mo.

SOME BARGAINS HERE.

1 Hendey Shaper, 15 in. stroke, imp. vice.
1 14 x 6 Screw Cutting Engine Lathe. New.

1 5 in. hole in Turret Screw Machine and Counter, \$25

1 Hendey Cutting-off Machine. New.

1 3-Spindle Garvin Drill Press, used 1 month.

Radial Drill, 5 1/2 ft. arm.

Axle Cutting-off Machine, Double Head, cut 9 1/2 dia.

Quantity 2nd hand Dodge Pulleys. Cheap.

Safety Construction Company's combined Trap and Pump.

And other machinery, new and second hand. Write for prices.

MACHINISTS' SUPPLY COMPANY,
39, 41 and 49 Central Ave., Rochester, N. Y.

SALE OR EXCHANGE.

1 8 x 20 Lathe, Wood & Light.

1 Bolt Header, new, guaranteed.

1 5 H.P. Gas Engine, new, guaranteed.

1 10 H.P. Gas Engine, new, guaranteed.

1 10 H.P. Horizontal Engine and Boiler.

1 80 H.P. Wright Engine.

1 35 H.P. Locomotive Boiler.

1 Punch and Shears.

6 Steam Pumps, &c., &c.

H. H. MANSFIELD,
126 Liberty Street, New York.

WANTED.

To furnish reasonable estimates on specialties in light metal work.

CLARK & COWLES, Plainville, Conn.
Manufacturers of Clock Trimmings, Rivets, Springs &c.

CORLISS

And Other Automatic Slide Valve Engines, Etc.

High Speed	Horizontal	Vertical
Corliss Auto.	Slide Valve.	Slide Valve.
10 x 20	11 x 20	9 x 20
10 x 24	10 x 24	10 x 12
18 x 22	13 x 12	10 x 24
22 x 36	22 x 36	11 x 20
26 x 48	22 x 36	12 x 18
30 x 52	16 x 36	12 x 24
30 x 72	15 x 24	11 x 24

HORIZONTAL BOILERS, 3, 6 x 18, 8, 5 1/2 x 16, 5 x 16, 3, 5 x 18, 1 1/4 x 12 and several others.

LOCOMOTIVE BOILERS, 80, 45, 50, 100 and 150 H.P. 1000 gal. Duplex Fire Pump, Brennan Crusher, Bogardus Mill, Burr Mill, Fan Blower, Platform Scales etc., etc. Send for catalogue.

G. M. CLAPP, 74 Cortlandt St., New York.

!!! FOR SALE !!!

BAKER BLOWERS, Nos. 3, 4 1/2, 5 1/2, 6, 7 and 7 1/2.

ROOT BLOWERS, Nos. 1, 2, 3, 5, 6 and 7.

Buffalo Blowers and Heating Apparatus.

1 Corliss Band Wheel, 12 ft. x 24 in. in halves.

1 No. 8 OLATON DUPLEX AIR COMPRESSOR, 22 in. Steam x 24 in. Air x 30 in. Stroke. Bargain.

A Variety of Machinery, very cheap.

Do you want to buy or sell Machinery? If so, write

C. R. BIGELOW, Machinery Expert,

45 Dey St., New York City.

FOR SALE.

SECOND-HAND.

ENGINES, Horizontal and Vertical. All types and sizes up to 2000 H.P.

BOILERS, Vertical and Horizontal and 3 Batteries of "Heine" water tube.

MILLS, 3 high, 12 in., 20 in., 22 in., 30 in. and 36 in.

1 Reversing 32 in. Blooming Mill complete.

STEAM HAMMERS. Various sizes up to 10 ton.

SHEARS. Cut from Bands to Blooms and one to cut Plates 1 1/4 in. thick, 90 in. long.

SQUEEZERS, ROLL LATHES, CRANES, GRINDING PANS, MACHINE SHOP TOOLS, &c.

LOCOMOTIVES. Fine condition, various sizes and gauges.

" If you don't see what you want, ask for it" of

B. M. EVERSON,
301 Smithfield St., Pittsburgh, Pa.

DON'T INVEST in expensive tools or machinery or let a contract before getting our estimate for making novelties or parts.

Fine, difficult and accurate parts a specialty. White metal work at prices that cannot be duplicated. Inventions perfected. Models made. Secrecy and satisfaction guaranteed, and no extra charge for new ideas or improvements To insure reply to letters of inquiry only, enclose stamp. THE H. H. FRANKLIN MFG. CO., Syracuse, N. Y.

FOR SALE.

CRANK and GEARED SHAPERS.

Write us for Bargains.

J. STEPTOE & CO. Cincinnati, O.

WANTED.

Responsible parties to manufacture and sell royalty, a cheap portable steel or iron CULVERT BRIDGE; it is adapted to all small streams, runs, etc., in roads, streets, RAILROADS, etc.; improved roads is the order of the day; use this bridge, put it below the level of the road, cover it over and thus prevent jarring and wear and tear of vehicles, etc. Apply to

W. A. NICHOLS,
Girard Building, Philadelphia, Pa.

BRASS FOUNDERS, ATTENTION !!

I have just invented a pressure governor for fluids that is a great improvement on all its predecessors. It will be used principally to control the pressure of city water and for steam. It serves equally well for all kindred purposes. The simplest thing in the world and the surest. Patents secured in the United States and applied for in England, Germany, France, Spain-Cuba, Belgium and Canada. I would like to correspond with reliable brass founders, in any country, who care for such business and who might want to manufacture these governors on royalty, controlling specified territory. CAPT. W. HOFFMAN, Salt Lake, Utah, U. S. A.

FOR SALE.

A Bargain, Very Little Used.

2 No. 2 Pratt & Whitney Tapping Machines with two countershafts to each.

1 No. 2 Pratt & Whitney Screw Machine with Patent wire feed attachment and counter-shaft. Address

J. F. WOLLENSAK,
Chicago, Ill.

SECOND-HAND MACHINERY.**ENGINE LATHES.**

- 2 11 in. x 5 ft. Raise and Fall Rest. Reed & Prentice. A1 order.
 1 15 in. x 8 ft. Plain Gib. Reed. A1 order.
 5 16 in. x 6 ft. R. & F. and Plain Gib. Carriage. Young. Blaisdell and Flather. A1 order.
 1 17 in. x 8 ft. Comp. Rest. P. C. Feed. Fifield. A1 order.
 2 18 in. x 8 ft. Comp. Rest. P. C. Feed. Fifield and Dustin. A1 order.
 1 19 in. x 6 ft. Comp. Rest. P. C. Feed. Fifield. A1 order.
 3 20 in. x 6 ft. x 8 ft. Plain and Comp. Rest. Bulard. A1 order.
 1 24 in. x 25 ft. Plain Rest. Lathe & Morse. A1 order.
 1 36 in. x 18 ft. Comp. Rest. Bement. Colby & M. Fair order.
 1 32 in. x 16 ft. Comp. Rest. Perkins. Practically new.
- DRILLS, SINGLE SPINDLE.**
- 2 20 in. Wheel and Lever Drill. Prentice & Davis. Good order.
 1 20 in. Geared Drill. Very heavy. Good order.
 1 20 in. x 38 in. Gap Wheel Feed Drill. Wood & Laight. Fair order.
- GANG DRILLS.**
- 3 Sensitive Drills. Slate. 1, 2 and 3 spindle. A1 order.
- ALSO LARGE STOCK NEW TOOLS.**

THE NILES TOOL WORKS CO.,
Eastern Branch, 136, 138 Liberty St., N. Y. City.

STEAM HAMMERS.

- 300 lb., Single frame, "Ferris & Miles" make.
 800 lb., Single frame, "Ferris & Miles" make.

DROP HAMMER.

- 1200 lb. with lifter, "Farrel Fdy's" make.

POWER HAMMER.

- 50 lb. "Bradley" Upright Herve Hammer. Improved style.

IN GOOD WORKING ORDER,
 and will be sold low if ordered at once before removal.

J. J. McCabe,
14 Dey Street, - New York.

FOR SALE, CHEAP.

400 tons of 60 lb. Rails, 75 tons of 25 lb. Iron Rails, 400 tons of 35 lb. second-hand Iron Rails with fastenings, one 4 horse-power Engine and 8 horse-power Boiler. Also other Engines and Locomotives, second-hand. Sawed and Cut Rails a specialty.

J. H. RICHARDSON & CO.,
 Pittsburgh, Pa.

**RELAYING RAILS
FOR SALE.**

I have on hand and for sale about 500 tons of 35 lb. Tee Iron Second-hand Rails with splices. Only used a short time and in excellent condition to relay. For prices address

W. F. BRONSON,
 Painted Post, N. Y.

MAP OF THE UNITED STATES.

A large handsome map of the United States mounted and suitable for office or home use, is issued by the Burlington Route. Copies will be mailed to any address (mentioning *The Iron Age*) on receipt of fifteen cents in postage by P. S. EUSTIS, Gen'l Pass. Agent, C. B. & Q. R. R., Chicago, Ill.

TO LET.

Store on the principal hardware street in New York, with or without fixtures. Or a portion of the same.

19 WARREN STREET.

WRITE FOR STOCK LIST

OF

**Shafting, Pulleys,
Hangers, Boxes,
Belting,
Couplings,**

USED AT THE WORLD'S FAIR.

The Belting is of the Best Quality, and the Shafting, Pulleys, Hangers, etc., are of the Highest Grade, and all of the material was in use such a short time that it is practically as good as new. This list comprises the entire outfit used in

**Machinery Hall, Transportation
and Electrical Bldgs.**

Now stored in our warehouses
at Saginaw, Mich.

FOR PRICES ADDRESS

**WICKES BROS.,
SAGINAW, MICH.****A Bargain.
A FINE
Business Opportunity**

for a live business man or two partners who have \$25,000 to invest in a first-class, old, well established and well located

JOBBING and RETAIL HARDWARE

business, which did not lose money last year.

STOCK IS WELL ASSORTED.

Good location in large Eastern City. Reasonable lease of premises can be continued. This will bear full investigation. Parties who can command above amount of capital address

"BARGAIN," Box 315,
 office of *The Iron Age*, 98-102 Reade St., N. Y.

LODGE AND**DAVIS**

Machine Tool Co., Cincinnati, O., U. S. A.,
 Have for sale a large line of first-class second hand Engine Lathes, Planers, Shapers, Drill Presses, Milling Machines, &c.

WRITE FOR LIST AND PRICES.

**PITTSBURGH
SALES AGENCY,**

J. H. HILLMAN, Manager,

No. 8 Wood St.,**Pittsburgh, Pa.,**

Offers for sale at very low prices BESSEMER STEEL WORKS and STRUCTURAL STEEL MILLS, also STEEL MILL for Rolling Bars and cold rolling, two BLAST FURNACES, a RUSTLESS IRON WORKS, interest in TIN MILL in INDIANA, TUBE WORKS and numerous other manufacturing interests and large quantity of very desirable COAL PROPERTIES, improved and unimproved.

Dealers in Coal and Iron Lands.

Examinations and Reports
on Properties.
References on Application.

WANTED:

to make arrangement with

Railroad and Machinist
**SUPPLY HOUSES
AND DEALERS IN
HEAVY HARDWARE**

to sell a new

CHAIN BLOCK.

This block is the best in the market and outclassed all others. Only wrought iron, steel and gun metal used in its construction. Address "CHAIN BLOCK," office of *The Iron Age*, 98-102 Reade St., N. Y.

A RARE CHANCE

to secure an established Machine Tool business in New England, with a good supply of orders, is offered by the advertiser, who must give preference to other interests. Tools, stock, etc., will be sold at a bargain.

Address "E.,"

office of *The Iron Age*, 146 Franklin Street, Boston, Mass.

FOR SALE OR LEASE.

New York City Rolling Mill, foot of East 23d street. Modern plant, consisting of three high 18 in. Muck Mill and 10 in. Finishing Mill, with Rolls to make 36 in. to 2 in. round or square, 56 in. to 3 in. flat, thick or thin sizes; two heating and one busheling or puddling furnace. Excellent location. Large trade in Merchant Bar and H. S. Iron, cheap scrap. Particulars and satisfactory reasons for disposing by personal interview only.

J. F. HANLEY,
 602-608 East 23d St., New York

Rare Bargains

In new and second-hand machinery. We are about to move into our new factory and wish to dispose of the following tools:

Second-hand.

36 in. x 36 in. x 18 ft. Lathe & Morse Planer.
30 in. x 30 in. x 7 ft. Whitecomb Planer.
36 in. Brainard Gear Cutter for Spur and Bevel.
22 in. x 10 ft. Star Tool Co. Engine Lathe.
22 in. Star Tool Co. Chucking Lathe.
37 1/4 in. x 10 ft. Ba'k Geared Polishing Lathe.
16 in. x 6 ft. Polishing Lathe.
15 in. x 18 ft. Polishing Lathe.
5 in. Cutting-off Machine, Nicholson & Waterman.
24 in. Hendey Shaper.
18 in. x 18 ft. Shafting Lathe.
15 in. x 12 ft. Engine Lathe.

The above will be sold at a fraction of their real value if bid for at once.

New Tools In Stock.

Nos. 1, 2, 3 and 4 Horizontal Boring Machines.
40 in., 50 in., and 76 in. Horizontal Boring Machines.
3 in. Bar Floor Boring Machine.
Bolt and Nut Facing Machine.

These at cut figures for the next 30 days.

WATERMAN MACHINE TOOL CO., Providence, R. I.

FOR SALE.

1000 feet of Iron Railing or Fence suitable for bridge, lawn or cemetery.

50 large cast iron Lamp Posts. Photograph on application.

C. W. SCHULTZ & CO.,
308 Walnut St., PHILADELPHIA.

BARGAINS.

Universal Milling Machine at \$125. Polishing Tumbling Barrel at \$50. 100 Lathe Drip Pans. each at \$1.75. Trip Hammer. 25 lb. b'low, at \$40. Duplex Steam Pump, 1 1/4 in. suction, 1 in. discharge, at \$35. Two 35 H.P. Vertical Tubular Boilers at \$225 each. Advise which you want.

C. W. SCHULTZ & CO.,
308 Walnut St., PHILADELPHIA.

BARGAINS IN Second-hand Machinery.

We offer at very attractive prices a lot of machinery from

The New Howe Sewing Machine Co.'s Plant,

INCLUDING

Engine Lathes,
Milling Machines,
Hand Lathes,
Planer, Drills,
Screw Machines,
Gear Cutters, &c.,
ALSO

A large stock of second-hand machine tools of all kinds. Write for detailed description and prices.

GARVIN MACHINE CO.,
Laight and Canal Sts., N. Y.

FOR SALE.

Entire plant of the Union Saw Co., including all machinery, tempering furnaces, etc., necessary for the manufacture of hand saws, etc., or advertiser will consider proposition of partnership. Address

2024 S. Sixteenth St., Phila., Pa.

WANTED.

One large Hydraulic Press. Address, stating capacity and lowest cash price.
"H. B. H." No. 426,
office of *The Iron Age*, 96-102 Reade St., N. Y.

100 CITIES AND TOWNS WANTING INDUSTRIES

Is the title of a pamphlet issued by the Illinois Central R. R. Co. If you are thinking of making a change in location and are not well informed as to the advantages of locating either in the West or South, write for a copy. If you want in a nutshell the

SALIENT POINTS OF OVER 100 PLACES

on the line of the Illinois Central and Yazoo & Mississippi Valley Railroads, giving the population, city and county debt, death rate, assessed valuation of property, tax rate, annual shipments, raw materials, industries desired, etc., apply to the undersigned. Our line is in the shape of the figure "7" and runs from Sioux Falls, S. D., and Sioux City, Ia., to New Orleans, passing through South Dakota, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Kentucky, Tennessee, Mississippi and Louisiana, and has

NEARLY EVERY KIND OF RAW MATERIAL

used in manufacturing, together with populous sections which are large consumers of the manufactured product. To sound industries which will bear investigation, substantial inducements will be given by many of our places, and they will be welcomed heartily by the different sections traversed by the Illinois Central and Yazoo & Mississippi Valley Railroads. For all information on the subject, address

GEO. C. POWER,

Industrial Commissioner I. C. R. R., Central Station, Chicago, Ill.

A N OLD ESTABLISHED hardware house in New York, whose salesmen cover the entire United States, wants the sole agency of American manufacturers of Chains, Toilet Clippers, Locks, Files, Carpenters' Tools and similar articles. Address

"W. B. G." No. 105,

Office of *The Iron Age*, 96-102 Reade St., New York.

TO RENT

In Center of Hardware District.

On May 1, 1894, I will remove to 88 Chambers Street and will rent part of store and basement and entire sub-cellars. Front of store will be entirely remodeled and improved. Immediate possession if desired. Apply to

R. CHRISTENSEN,

90 Chambers St., N. Y.

THE
Very Desirable Second Loft
No. 99 CHAMBERS STREET,
CORNER OF CHURCH, 25 X 100 FEET,

TO RENT,

from May 1st. Light and airy. Entrance on Chambers Street, with steam elevator on Church Street.

THE AMERICAN WRINGER CO.

BUSINESS OPENING.

A superintendent wanted for a long established company building Corliss Engines and heavy machinery specialties, a man having \$10,000 to \$25,000 to invest in the business and to take charge of the manufacturing department. Only men well up in best methods of low cost work in machine shop and foundry and having record with successful companies will be considered. Address

"CORLISS," No. 426,

Office of *The Iron Age*, 96-102 Reade St., New York.

I WANT TO ASSOCIATE myself with a business man who has capital to put on the market a manufacture of steel, controlled by patents, and can be extensively sold at large profits. I also want a few men who are selling to the hardware trade, to sell on commission as a side line a fence wire stretcher. Carry sample in pocket. Address

"P.," Box 824,

Canandaigua, N. Y.

An old established

manufacturing company employing several travelers that visit the jobbing hardware trade in the United States and Canada, would like to arrange to sell one or two lines of specialties in connection with their present line.

"ENTERPRISE,"

Office of *The Iron Age*, 96-102 Reade St., N. Y.

New York Representative

With ample facilities for carrying stock, long experience and a location in the center of the hardware district, I desire to represent in New York and surrounding territory, on salary or commission, manufacturer of goods for the hardware trade.

R. CHRISTENSEN,
88 Chambers St., N. Y.

ASSIGNEE'S SALE

OF

HARDWARE BUSINESS

In the growing city of Fitchburg, Mass., the old established hardware business of A. B. Lawrence & Co. A rare opportunity. Stock \$20,000 to \$25,000. Address

JOSIAH E. BACON, Assignee,
107 Oliver St., Boston, Mass.

EUGENE BISSELL, Auctioneer.

E. BISSELL, SON & CO.,

Successors to
HAYDOCK & BISSELL,
WHOLESALE

HARDWARE AUCTIONEERS,

19 Murray St. and 15 Park Place, N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

Collections!

ATTENTION! Merchants and Manufacturers.—We collect your past due accounts. Do not let them remain too long upon your books. Send for our draft book.

THE HARDWARE BOARD OF TRADE, Ltd.,
4 and 6 Warren street, New York.
JAS. H. GOLDEY, Treas.

TO LET.

Premises recently occupied by the Reading Hardware Company, fronting on Reade Street, with sign privilege and egress and ingress from Chambers street. A desirable location, fitted completely with shelving gas fixtures, etc. Ready for occupancy May 1, 1894. For terms and particulars apply to

J. C. McCARTY & CO.,

97 Chambers St., N. Y.

THE CLEASON-BRANSON BICYCLE.

To the readers of *The Iron Age*.

The bicycles which have been made embodying this invention have given every satisfaction and I feel certain that no live maker can dispense with the modern principle found in this invention, as it has been proved that no ROADSTER is perfect without it. Several first-class manufacturers want to use this invention and later you may hear from them through *The Iron Age* and other first-class Journals, as I feel like letting all our first-class manufacturers have license to use this invention.

Yours, etc., JOHN BRANSON,
2221 N. Front St., Philadelphia.

Wanted, A Punching Press

with index feed to cut notches in the edges of sheet iron disks.

WM. J. BRANDT,
Bound Brook, N. J.

Irondale Furnace Property and Iron Valley Standard Gauge Railroad, connecting with B. & O., and Rolling Stock For Sale.

1310 acres, two veins of coal, one coking and one stone, veins five and six feet thick, seven million tons of coal. Iron ore, fire clay, natural gas, ore and coal mines open, coking ovens. Modern furnaces with Whitwell stoves, dwelling houses, offices, etc. Seventy buildings. For further description of property apply to W. N. HANEY, Supt., Independence, Preston Co., W. Va.

WANTED.

Second-hand and in good condition.

A complete power plant to work to an average load of 25 H.P., as follows: 8 in. cylinder automatic engine, locomotive boiler, blow off tank, pump for emptying tank, small heater, &c.

Those having all or any part of the above please address, with details and prices.

Office of *The Iron Age*, 220 So. 4th St., Phila.

NOW is the time to INVEST in

SOUTHERN TIMBER- MINERAL LANDS,

Before prices advance. All kinds of mines for sale.

E. C. ROBERTSON,
Terms Easy. CINCINNATI. O. Titles Perfect

HELP WANTED.

Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

ROLL TURNER on bar and guide mill; wages six dollars, Mexican silver. COMPAÑIA INDUSTRIAL MEXICANA, Chihuahua, Mexico.

SALESMAN.—By a large manufacturer of steel, iron, copper and wire; must be a young man of good ability and address; applications must include full information, age, experience, references, &c., and will be considered confidential. Address "ELECTRIFY," office of *The Iron Age*, 96-102 Reade St., New York.

WANTED FOR CANADA.—A man thoroughly conversant in manufacturing of all lines of Tacks, to take charge of shop in Canada. Reply P. O. Box 2091, Montreal.

A YOUNG MAN familiar with office work in pricing of invoices, etc., may address, with references, "IMPORTERS AND JOBBERS," office of *The Iron Age*, 96-102 Reade St., New York.

A EXPERIENCED Traveling Salesman to travel mill, furnace and mine supplies and machinery; none but an experienced man need apply. Address "L. F. M.," Box 488, Richmond, Virginia.

A COMPETENT person to take charge of the polishing and buffing room of a large brass finishing establishment; must be familiar with iron work also; first-class references required. Address "BRASS WORKER," office of *The Iron Age*, 96-102 Reade St., New York.

A FOREMAN to take charge of threading department of a bolt works. Address, giving age, experience and salary expected, "BOLTS," Box 419, office of *The Iron Age*, 96-102 Reade St., New York.

SALESMAN calling on carriage manufacturers and jobbing or large retail carriage hardware trade West, South and East to handle line of excellent selling staple specialties, side line (commission), or resident responsible representatives in Chicago, Philadelphia, St. Louis, New York, San Francisco and Boston who can reach tributary trade and do justice. "SALESMAN," Lock Box 1086, Philadelphia.

SITUATIONS WANTED.

Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

A MIDDLE-AGED MAN having an experience of 15 years as office manager for a large hardware manufacturer seeks a similar position, or that of bookkeeper, cashier or correspondent; salary moderate; excellent references. Address "RESPONSIBILITY," office of *The Iron Age*, 96-102 Reade St., New York.

A FOREMAN of machine shop, by thorough practical machinist, 34 years of age, with eight years' experience in handling men; considerate, a hustler; can give good reference. Address "MACHINERY SHOP," office of *The Iron Age*, 96-102 Reade St., New York.

YOUNG MAN with knowledge of retail and thoroughly experienced in the wholesale hardware business, four years with the largest firm of its kind in the West, desires a position, salesman preferred; or to act as a manufacturer's agent in Chicago or other large Western city; unquestionable references. Box 32, office of *The Iron Age*, 59 Dearborn St., Chicago.

A FOREMAN of foundry. Address "PUSHER," Box 428, office of *The Iron Age*, 96-102 Reade St., New York.

TWO YOUNG MEN with good experience in hardware manufacturing would like chance to take charge of hardware and plumbing business in a good town; can furnish some capital; we are hustlers and will work for success; can furnish best of references. Address "HUSTLERS," No. 426, office of *The Iron Age*, 96-102 Reade St., New York.

A SUPERINTENDENT, by a man of large experience in designing and directing the construction of fine interchangeable machinery, specialties, machine tools, printing and shoe machinery; am patentee of new lathe which I wish to dispose of or would arrange for the manufacture of same under royalty. Address "INVENTOR," office of *The Iron Age*, 146 Franklin St., Boston, Mass.

A EXPERIENCED business man, late cashier and bookkeeper for a large iron and steel manufacturing company in East Pennsylvania, desires suitable position with tin plate manufacturing company with privilege of investing in the business, if mutually satisfactory. "TIN PLATE," office of *The Iron Age*, 96-102 Reade St., New York.

A CHIEF DRAFTSMAN and Engineer, by an engineer thoroughly acquainted with Bessemer, open hearth and rolling mill practice, designing of rolls, hydraulics and general machinery. Address "CHIEF," No. 426, office of *The Iron Age*, 96-102 Reade St., New York.

YOUNG MAN desires a position as Salesman to call on the hardware trade; seven years' experience in retail business, inside and outside work; not afraid of work; Al reference; will make terms satisfactory. Address "SALESMAN," office of *The Iron Age*, 220 South 4th St., Philadelphia.

BY A MECHANICAL ENGINEER and Draftsman; have had ten years' experience in steam, hot water, hot air and sheet iron work; can handle skilled and unskilled labor to good advantage; have no objection to locality; strictly temperate and reliable. J. P. LISK, 636 Monroe St., Brooklyn, N. Y.

SALESMAN of 20 years' experience, with office in Philadelphia, desires to represent manufacturers of hardware specialties in the cities of Philadelphia, Baltimore and Washington. "AGENT," office of *The Iron Age*, 220 So. 4th St., Philadelphia.

BY A THOROUGH hardware traveling Salesman; 20 years' active experience in store and on the road in all lines of general hardware, cutlery, guns, &c., also make cutlery and builders' hardware specialties. Address "EXPERIENCE," office of *The Iron Age*, 59 Dearborn St., Chicago.

EXPERIENCED office man wants position with hardware house; eighteen years' experience with two first-class wholesale and jobbing houses; thoroughly competent to take charge of correspondence, costs, quotations, price-lists, assist buyer; hard worker; highest references; moderate salary; distance no object. Address "ALAMO," office of *The Iron Age*, 96-102 Reade St., New York.

A YOUNG MAN, for several years connected with the engineering department of one of Philadelphia's largest manufacturing concerns, would like to take the agency for Philadelphia and vicinity for the sale on commission of the product of an iron works or other manufacturing business; the advertiser has the advantage of an intimate personal acquaintance with the prominent iron firms, shipbuilders and electric railway people. Address "AGENCY," office of *The Iron Age*, 220 So. 4th St., Philadelphia.

A MEMBER of the American Society of Mechanical Engineers, at present manager and general superintendent of a large machine shop and foundry, desires to change his location; any manufacturer, of machinery or steam plants who needs a man of solid experience ought to address "EARLE," office of *The Iron Age*, 22-24 Pickering Building, Cincinnati, O.

A S ROLLER on small mill; by a man of 15 years' experience; is thoroughly posted in all kinds of guide mill work; is also experienced in structural shape iron; is strictly temperate; can give best references. "ROLLER," No. 419, office of *The Iron Age*, 96-102 Reade St., N. Y.

B Y experienced mechanic as superintendent of manufactory making locks and builders' hardware a specialty; 15 years' experience as superintendent; understands the business in all its branches; can handle men and material economically. Address "M. C.," No. 419, office of *The Iron Age*, 96-102 Reade St., N. Y.

A S foreman of iron foundry by a thorough practical foundryman with six years' experience as foreman; can handle men and material in an economical manner. Address "H. J.," No. 419, office of *The Iron Age*, 96-102 Reade St., N. Y.

A GENCY WANTED.—Advertisers desire to represent manufacturer of first-class tool and other steels; have ample facilities for carrying stock and long established trade; would also like one A1 side line. Address "J. & H.," Box 419, office of *The Iron Age*, 96-102 Reade St., N. Y.

TO MANUFACTURERS OF BRASS GOODS.—A gentleman well posted in the requirements of the plumbing trade desires a position as manager or general agent to represent a first-class house manufacturing fine sanitary specialties; have had 23 years' experience in the manufacture of this line of goods and can furnish considerable business to desirable parties. Address "SPECIALTIES," No. 419, once of *The Iron Age*, 96-102 Reade St., New York City.

B Y YOUNG MAN; six years' experience in wholesale builders' hardware; desires position where by strict attention to business he can advance himself; first-class references given. Address "BUILDERS' HARDWARE," Box 412, office of *The Iron Age*, 96-102 Reade St., N. Y.

B Y A HARDWAREMAN; seventeen years' experience in builders' hardware, iron, steel, tinware, etc.; a man of family, good habits and health; wants position to represent on Pacific Coast Eastern manufacturer or wholesale house; well acquainted with part of the country and trade; willing to travel; responsible and can furnish bond. Address "J. W. A.," care E. S. Adams, office of *The Iron Age*, 312 The Cuyahoga, Cleveland, Ohio.

TO BRASS FOUNDERS.—A thoroughly practical foreman molder, with large and varied experience, well up in melting and mixing of metals to suit every description of work; for years at the Delamater Iron Works, New York City; electrical work and copper castings a specialty; can give best of references; machinery jobbing shop, preferred. Address "P. A.," Citizens National Bank, Yonkers, N. Y.

SELLING AGENCY WANTED, for blast furnace and iron and steel works products, by a gentleman having extensive acquaintance among railroads, founders and shops. Address "AGENT," No. 111, office of *The Iron Age*, 96-102 Reade St., New York.

A MEMBER OF AMERICAN SOCIETY OF MECHANICAL Engineers, who has had 20 years' practical experience as follows: mechanician, head draughtsman, erector of steam plants, engineering, estimating, contracting and office work and superintendent of large engine works, is available for responsible position. Address "ENGINE WORKS," No. 16, office of *The Iron Age*, 96-102 Reade St., New York.

THE LATEST BOOKS.

Art of Coppersmithing. By JOHN FULLER, Sr. A Practical Treatise on Working Sheet Copper in all Forms. This work, prepared at great labor and expense, is reproduced from *The Metal Worker*, and forms an exhaustive treatise on the Coppersmiths' Art, being the only volume on that subject that has been published. It is beautifully illustrated with 474 pen and ink drawings, and is bound and printed in the best manner. 327 pages, 4 $\frac{1}{4}$ illustrations, 7 x 10 inches, cloth.....\$3.00

Concrete, Its Nature and Uses. By GEORGE L. SWARTZFFE. A Book for Architects, Builders, Contractors and Clerks of Works. 8vo, cloth, Illustrated.....\$3.00

The Modern American Pistol and Revolver. By RALPH GREENWOOD (A. G. GOULD). Entirely new edition. Very fully illustrated. 8vo, cloth.....\$1.50

A Text-Book on Gas, Oil and Air Engines; or Internal Combustion Motors without Boiler. By B. DONKIN. 136 Illustrations, 4 $\frac{1}{4}$ pages, 8vo, cloth.....\$8.40

A Treatise on the Kinetic Theory of Gases. By H. W. WATSON. Second edition, revised and enlarged. 12mo, cloth.....\$1.00

Engineering Drawing and Design. By S. H. WELLS. A Manual for Technical Schools and Colleges. With numerous illustrations prepared expressly for the work. Part I.—Practical Geometry, Plane and Solid. Part II.—Machine and Engine Drawing and Design. 2 vols, 8vo, cloth.....\$2.50

Lamp Primer, or Lamp Light and Lamps, and How to Care for Them. By JOHN JONES BURY. 12mo, flexible cloth.....\$0.50

The Theoretical Elements of Electro-Dynamic Machinery. By A. E. KENNELLY. 8vo, cloth.....\$1.50

The Illustrated Architectural, Engineering and Mechanical Drawing-book. By R. S. BURN. For the use of school students and artisans. Tenth edition. 156 pages, 8vo, cloth.....\$1.00

Machine Construction and Mechanical Drawing. By T. CRYER and H. G. JORDAN. Fifth edition, revised and enlarged. 4to, cloth.....\$1.20

The Electric Transformation of Power and its Application by the Electric Motor, Including Electric Railway Construction. By PHILIP ATKINSON. Illustrated. 12mo, cloth.....\$2.00

Helical Gears. A practical Treatise. By a Foreman Pattern-maker, author of "Pattern-making," "The Principles of Fitting," etc. Illustrated with 100 engravings and frontispiece. 12mo, cloth, 127 pp.....\$2.00

A Manual of Practical Assaying. By H. VAN F. FURMAN, E. M. 8vo, cloth.....\$8.00

Pigments, Paint and Painting. By GEORGE TERRY. A Practical book for Practical Men. 12mo, cloth, 392 pp. Illustrated.....\$3.00

Depreciation of Factories, Mines and Industrial Undertakings and their Valuation. By EWING MATHESON. Second edition. 143 pages, 8vo, cloth.....\$3.00

Notes on Cylinder Bridge Piers and the Well System of Foundations. By JOHN NEWMANS. Especially written to assist those engaged in the construction of Bridges, Quays, Docks, River Walls, Weirs, &c. 136 pages, 8vo, cloth.....\$2.50

Metal Working for Amateurs. Edited by FRANCIS CHILTON YOUNG. In 3 parts. Part 1. Brazing and Soldering, by G. EDWINSON. Part 2. Practical Gas Fitting, by E. W. DENNIS. Part 3. Brass Casting at Home, by F. J. DURRANCE. Illustrated with numerous diagrams, explanatory sketches and working drawings. 110 pages, cloth.....\$0.40

The Incandescent Lamp and Its Manufacture. By G. S. RAM. 218 pages, 8vo, cloth.....\$3.00

How to Wire Buildings. By AUGUSTUS NOLL, E. E. A Manual of the Art of Interior Wiring. Cloth, 8vo. Illustrated. 162 pages.....\$1.50

A B C Five-figure Logarithms for General Use. By C. J. WOODWARD. Containing mantissa of numbers to 10,000. Log. lines, tangents, cotangents and coinesines to 10 seconds of arc. Together with full explanations and simple exercises showing use of the tables. Flexible leather cover and size convenient for the pocket.....\$1.60

Sent, post-paid, on receipt of price, by

DAVID WILLIAMS, Publisher & Bookseller,
96-102 READE ST., NEW YORK.

ANNOUNCEMENT.



DODGE MANUFACTURING CO.

beg to announce the opening of their New York Branch at 43 and 45 Dey St., on May 1st, 1894, where an extensive and complete stock of

POWER TRANSMISSION MACHINERY

will be carried. Contracts for complete plants a specialty. A **New Complete Catalogue** will be ready for distribution about May 15th.

DODGE MANUFACTURING COMPANY,

Works and Main Office, Mishawaka, Ind., U. S. A.

Chicago Branch, 166-174 S. Clinton St.

New York Branch, 43 and 45 Dey St

J. A. FAY & CO.,
288 to 308 W. Front St., Cincinnati, Ohio, U. S. A.
ORIGINATORS, INTRODUCERS AND CONSTRUCTORS OF
WOOD-WORKING MACHINERY
Of Every Description.
Machines for any Want Supplied.
Largest Line in the World

We captured all the "Honors" at the World's Fair for superiority.

The English and American Mechanic:

AN EVERY-DAY HAND-BOOK FOR THE WORKSHOP AND THE FACTORY.

CONTAINING

Several Thousand Receipts, Rules and Tables Indispensable to the Mechanic, the Artisan and the Manufacturer.

By B. Frank Van Cleve.

A new, revised, enlarged and improved edition, edited by Emory Edwards, M.E.

ILLUSTRATED WITH EIGHTY-FIVE ENGRAVINGS.

In one volume, 500 pages, 12mo, closely printed, containing a vast body of information of value to all practical men. Elegantly bound in scarlet cloth, gilt. Price \$2.00.

SENT POSTPAID, ON RECEIPT OF PRICE, BY

DAVID WILLIAMS, Publisher and Bookseller.

96-102 Reade Street, New York.



J. Popping's
Patent Machine
and Tool Wks.

MANUFACTURERS OF
Solid Iron Shoulder Rabbet Planes, etc., etc., and
Hofstatter's Patent Hair Picking Machine.
N. E. Cor. 58th St. and 11th Ave., N. Y.

The L. E. Rhodes Co.,
HARTFORD, CONN.,
Contracts to make
Special Machinery
AND
Hardware Specialties.

SPECIAL

And Automatic Machinery and Tools for reducing cost of manufacturing machines, parts of machines, articles of hardware, &c., designed and built. Tools, models and experimental work. Estimates given. Correspondence solicited.

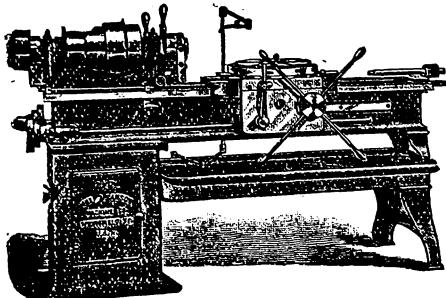
IDEAL MACHINE WORKS,
P. O. Box 655 Hartford, Conn.

The Scattergood
Time Record and
Pay Roll Book.
(Pat. Oct. 13, 1891.)
Address for Circular to
HENRY W. SCATTERGOOD,
23 Richmond St., Phila., Pa.

KEEP BOOKS
by WEST'S New Original-ENTRY LEDGER.
Make the same entry but once. A Ledger in place of a full set of books. Convenient forms for all entries. Easily applied, simple, saves time. West's Self-Proving Balance locates every error. Send 3 cent Stamps for illustrated 16-page pamphlet.

WOLCOTT & WEST, Syracuse N. Y.

HAVE YOU A

FLAT TURRET LATHE ?

If not send for

RAPID LATHE WORK.
JONES & LAMSON MACHINE CO.,

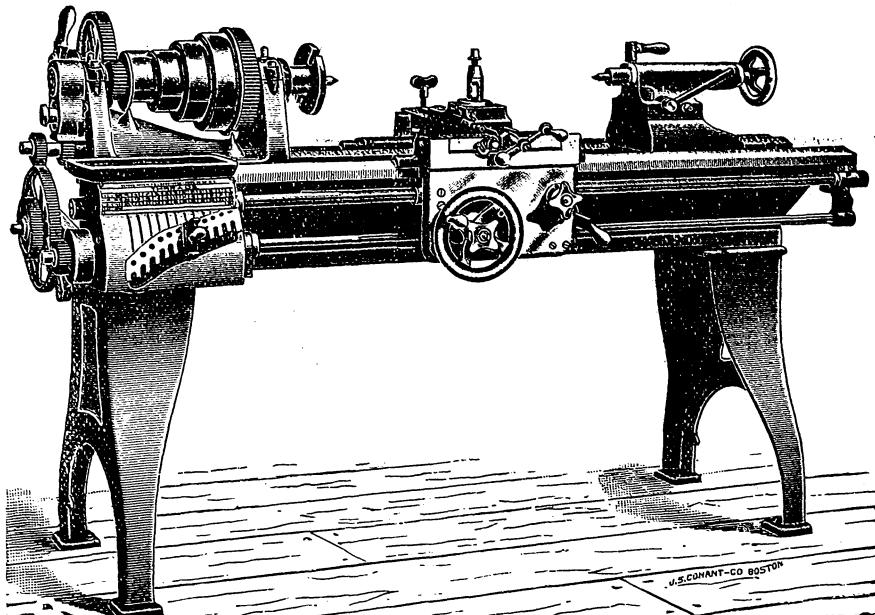
SPRINGFIELD, VT., U. S. A.

A TREATISE ON TOOTHED GEARING.

Containing complete instructions for Designing, Drawing, and Constructing Spur Wheels, Bevel Wheels, Lantern Gear, Screw Gear, Worms, &c. and the proper formation of Tooth Profiles. For the use of Machinists, Pattern Makers, Draughtsmen, Designers, Scientific Schools, &c. With many plates. By J. Howard Cromwell. 12mo, cloth. \$1.50.

Sent, post-paid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller,
98-102 Beale Street, NEW YORK.



J. S. CONANT & CO. BOSTON

The Hendey Machine Co., Torrington, Conn.

A NEW FEATURE IN SCREW CUTTING ENGINE LATHES. THE HENDEY-NORTON LATHE.

This lathe cuts 12 different screws, from 6 to 20, without changing the gears, and feed changes from 36 to 120 cuts per inch without change. This cut shows a 14-inch x 6-foot Lathe. It has hollow spindle, 1-inch. Has compound or elevating rest, as preferred, or the double carriage rise and fall rest. Also taper attachment if desired. The carriage reverses for screw cutting without the use of the countershaft, from the lever at the end of carriage, allowing the spindle to run in one continuous direction. In stock for immediate delivery, 14-inch, 16-inch and 18-inch 20-inch and 30-inch in the works. Send for descriptive catalogue.

CHAS. CHURCHILL, Ltd., London, England, }
SCHUCHARDT & SCHUTTE, Berlin, Germany, } AGENTS.
EUGENE SOLLER, Basel, Switzerland,

The Hendey Machine Co., - Torrington, Conn.

Do You BORE CYLINDERS?

THE HORIZONTAL BORING MACHINE

IS A SPECIAL TOOL FOR THIS PURPOSE.

SEND FOR PARTICULARS TO

NEWARK MACHINE TOOL WORKS,
NEWARK, N. J.

J. A. FAY & CO., CHICAGO, WESTERN AGENTS.

14



So far in 1894
the STEARNS
has led all the
rest in every
race meet held.

World's**Records.**

E. C. STEARNS & CO.,
Syracuse, N. Y.

ALUMINUM.**The Pittsburgh Reduction Co.,**

116 Water St., Pittsburgh, Pa.,

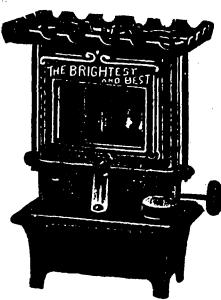
Offer Aluminum guaranteed equal in purity to the best in the market, at lowest rates obtainable.

ALUMINUM SHEET, WIRE,
AND CASTINGS.

The STEARNS
Bicycles cap-
tured these
records in the
year 1893.

B. & B. Money Makers.

No. 01 B. & B. LAMP STOVE.



List Price, \$8.00 per dozen.
Code word, *Garden*.
Packed one dozen in box.
Weight, 50 lbs.
Height, 8½ inches. Size of Tank,
3½ x 5½ inches.
NICKEL FRONT. Four-inch wick.



No. 02 B. & B. LAMP STOVE.

List Price, \$16.00 per dozen.
Code word, *Garter*.
Packed one dozen in box.
Weight, 85 pounds.
Height, 8½ inches.
Size of Tank, 5½ x 5¾.
NICKEL FRONT. Two 4-inch wicks.



No. 03 B. & B. LAMP STOVE.

List Price, \$24.00 per dozen.
Code word, *Gauge*.
Packed ½ dozen in box.
Weight, 65 pounds.
Height, 8½ inches.
Size of Tank, 5½ x 8½ inches.
NICKEL FRONT. Three 4-inch
Wicks.

Our discounts will interest you. B. & B. Lamp Stoves, Ovens, Cook Stoves and Oil Heaters are up to the times. Our Prices are made to suit the times. Ask for our 80 page catalogue and be convinced.

The Glazier Stove Co., Mfrs., CHELSEA, MICH.

W. W. MONTAGUE & CO., San Francisco, General Agents for the Pacific Coast.

WHITE MOUNTAIN FREEZERS.

THE BEST FREEZER. Heavy Waterproof Tubs. Cans of Charcoal Tin-plate. Malleable Iron Dashers. All inside parts tin-plated. Gearing completely covered.
SELLER. Inquire of any leading jobber or write us.
The White Mountain Freezer Co., Nashua, N. H.



The true test of a Freezer is how well it performs its work; in this respect the unsolicited testimony of thousands pronounce the "Packer Freezers" unexcelled.

GOOD LUCK, STANDARD, AND CONFECTIONERS' MACHINE FREEZERS.

The "Good Luck" is the latest and best low price Freezer on the market. Inside Castings Tinned, Malleable Iron Fittings, Automatic Scraper, White Cedar Pails with Galvanized Steel Hoops. Pine Pails, or Wire Rings with bottom of pail unprotected are not used.

CHAS. W. PACKER, Mfr., 20 N. Fourth St., Philadelphia.

THE WILLIAMS PRINTING CO.,

Commercial Printers AND Binders.

ESTIMATES FURNISHED FOR ALL CLASSES OF WORK.

96, 98, 100 and 102 READE STREET,

NEW YORK.

In Architecture, Architectural Drawing, Plumbing, Heating and Ventilation, Bridge Engineering, Railroad Engineering, Surveying and Mapping, Electrical Engineering, Mechanical Drawing, Mining, English Branches, and

INSTRUCTION BY MAIL

In Architecture, Architectural Drawing, Plumbing, Heating and Ventilation, Bridge Engineering, Railroad Engineering, Surveying and Mapping, Electrical Engineering, Mechanical Drawing, Mining, English Branches, and

MECHANICS.

Diplomas awarded. To begin students need only know how to read and write. Send for FREE Circular of Information stating the subject you think of studying to THE CORRESPONDENCE SCHOOL OF MECHANICS AND INDUSTRIAL SCIENCES, Scranton, Pa.

4000 STUDENTS.



Gem Ice Shave.

For shaving ice from blocks without removing from refrigerator. Shaved ice is required for cooking canta-loupes, melons, tomatoes, and other fruit, for oysters and clams on half shell, for cooling wines, liquors, lemonades, iced drinks, for use at soda fountains, bar rooms, restaurants, etc.

List Price, \$6.00 per dozen, less discount.

CROWN ICE CHIPPER.

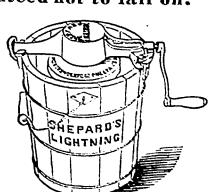
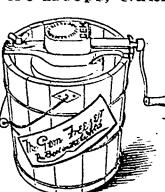
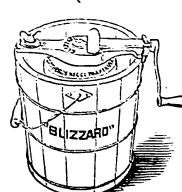
The only simple, effective and cheap tool for chipping ice to use in freezers in place of old-time bag and hatchet. Reduces ice quickly to small uniform pieces, size of peanuts. Used with great advantage to chip ice for soda fountains, bar rooms, restaurants, etc.

List Price, \$6.00 per dozen, less discount.



The BEST FREEZERS

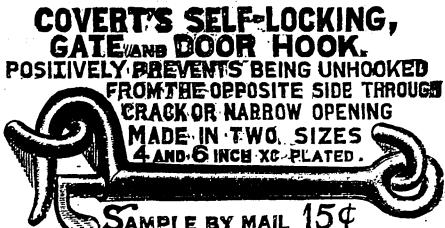
Pails made of Virginia White Cedar with Electric Welded Wire Hoops, Guaranteed not to fall off.



STRONGER—HANDSOMER—LAST LONGER.

For Particulars, Prices and Discounts, write.

NORTH BROS. MFG. CO., PHILADELPHIA, PA.
New York Agents, JOHN H. GRAHAM & CO., 113 Chambers St.



SAMPLE BY MAIL 15¢

Call for Our Banner Bolt Snap.

This snap has many important advantages over other makes of Bolt Snaps, viz.: It is lighter, the spring is entirely covered and protected from foreign substances and freezing, and is lower in price.

Made in all sizes; Round, Loop and Open Eye. We are headquarters and the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties.

Covert's Saddlery Works,
FARMER, N. Y., U. S. A.

Hardware Dealers Can Profitably SELL BICYCLES.

There is a large trade in Bicycles in all parts of the country and much of that trade naturally belongs to dealers in hardware. Good bicycles meet with a ready sale and pay a fair percentage of profit.

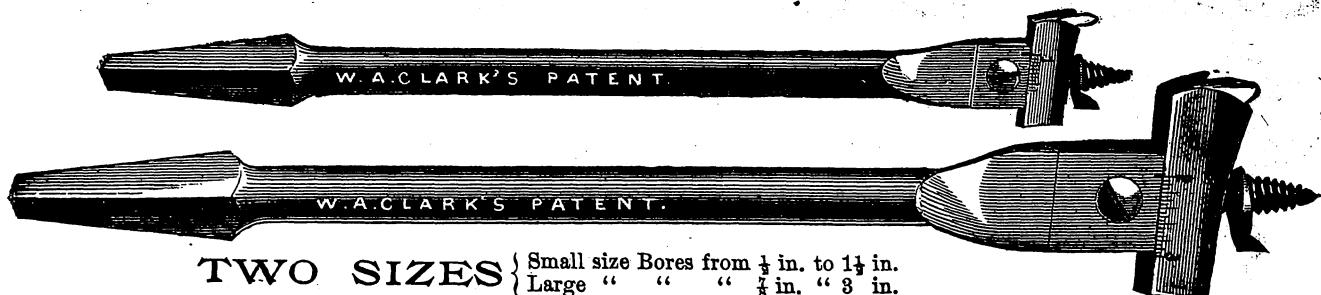
COLUMBIAS

Are the representative high grade machines in America. A Columbia is the easiest machine to sell to the best trade because it is unquestionably the standard wheel of the world.

We want enterprising agents of good standing and solicit correspondence.

Pope Mfg. Co.,
221 Columbus Ave.,
Boston, Mass.

THE WM. A. CLARK PATENT EXPANSIVE BIT.



TWO SIZES { Small size Bores from $\frac{1}{4}$ in. to $1\frac{1}{4}$ in.
Large " " " $\frac{1}{2}$ in. " 3 in.

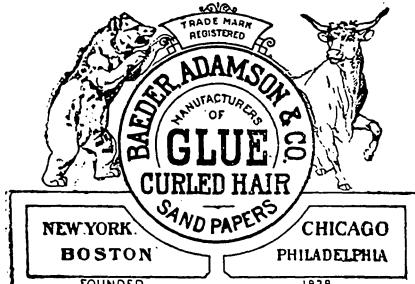
SPECIAL CUTTERS: No. 5—For Large Bit, Bores from 3 in. to 4 in. No. 6—For Large Bit, Bores from 4 in. to 5 in.

Stock and workmanship superior to all others. Every part interchangeable.

Quality guaranteed. For sale by all Hardware Dealers.

Manufactured by **R. H. BROWN & CO.,** New Haven, Conn.

You take no risk on the quality.
We make only the best!



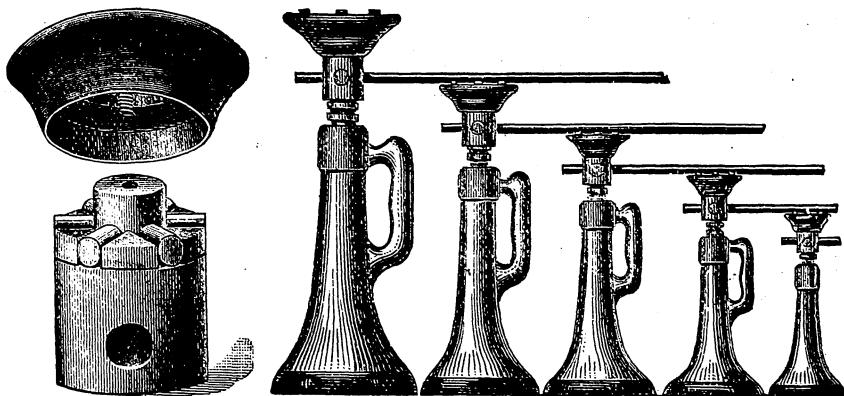
Sand Papers { Flint Paper
Garnet Paper
Emery Paper
Emery Cloth
IN Reams and Rolls

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & CO.

730 MARKET STREET, PHILADELPHIA.
67 BEEKMAN STREET, NEW YORK.
143 MILK STREET, BOSTON.
182 LAKE STREET, CHICAGO.

ROLLER JACK SCREW.



We have experimented much with ball bearing Jacks, and found them very satisfactory when not heavily loaded. Now, instead of balls we put in rollers, as seen in cut. These rollers will stand any load that the Jack will carry, and are not liable to get out of order. We have thoroughly tested these Roller Jacks with a spring balance and find a saving of forty per cent. of power needed to lift a given weight.

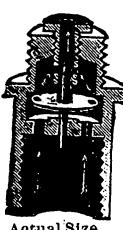
The price is about ten per cent. more for Roller Jacks, and the gain is 40 per cent. This ought to insure their sale as fast as the facts become known.

MILLERS FALLS CO.,

93 READE STREET, - - - - - NEW YORK.

"Economist" Gas Governor

GAS BILLS REDUCED 25 PER CENT.



Retails for 30 cents and gives large profit to agent. We place our governors on trial for 30 days and guarantee perfect satisfaction. Agents wanted in all cities and towns where gas is used. Write for circular and agents' price to



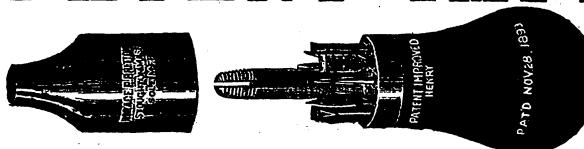
The New York Gas Saving Co.,

Decker Building, Union Square, N. Y.

PATENT IMPROVED

HENRY COMBINATION HAFT,

Containing five Brad-Awls, one Chisel-Screw Driver, Diamond Point Awl, Marking Awl, Counter-Sink, Tack Puller and Reamer. Send for Circular of full description and illustration. If you would have the Best, get the Patent Improved. Sent post-paid on receipt of \$1.00.



HORACE E. BRITTON, Patente and Sole Manufacturer, STOUGHTON, MASS.

THE GEM SOLID STEEL MINCER



Single
and
Double Blades.

Handle and Blade Formed in one piece.
Always Clean. Indestructible.
No Rivets to Wear Loose.
No Wooden Handle to Shrink, Swell, Loosen,
Split, or Fill with Rancid Grease.

MANUFACTURED BY
PALMER HARDWARE MFG. CO.
TROY, N. Y.

CABINET LOCKS

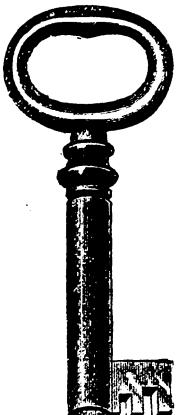
OF EVERY KIND.

DRAWER LOCKS,
CUPBOARD LOCKS,
WARDROBE LOCKS,
CHEST LOCKS,
DESK LOCKS.

A complete line of more than 1000 list numbers exclusive of our old
and complete line of



YALE CABINET LOCKS.



THE YALE & TOWNE M'F'G CO.,
STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburgh. San Francisco.

LePage's Liquid Glue

IS UNIVERSALLY CONCEDED TO BE

The BEST in the WORLD.

Its Superior Quality has created for it an Established Demand, and it sells without effort and upon its merits

IT IS ALWAYS RELIABLE,
and the dealer who buys it is Not Experimenting.

BEWARE OF IMITATIONS and SUBSTITUTES.

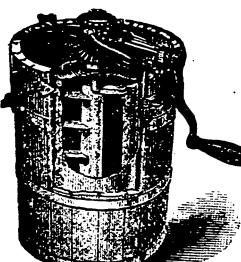
We can furnish original and attractive advertising matter for "LEPAGE'S GLUE" upon request.

SEND FOR CIRCULARS AND PRICE-LIST.

RUSSIA CEMENT CO, Gloucester, Mass.

NEW YORK OFFICE, 95 Reade and 113 Chambers Streets.

PACIFIC COAST OFFICE, 23 Davis St., San Francisco, Cal.



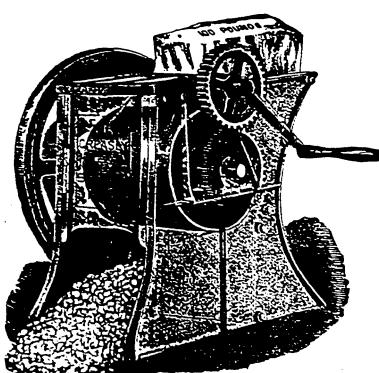
"Home" Freezers,
2 to 10 quarts.
"Rapid" Freezers,
2 to 40 quarts.
"Rapid"
Ice-Breakers,
4 sizes.
Sundry Ice-Cream
Apparatus.

Send for Descriptive Catalogue and Attractive Quotations.

CLEMENT & DUNBAR,
No. 1129 Beach St., PHILADELPHIA.

CREASEY ICE BREAKERS.

HAND OR POWER. 7 SIZES.



No. 1 (Hand or Power) Machine.

Jos. S. Lovering Wharton,
MANUFACTURER,
GERMANTOWN JUNCTION,
PHILADELPHIA, PA.

BUCKEYE SPRAYING PUMPS,

Also BUCKEYE Force
and Lift Pumps,
COLUMBIA Steel & Iron
Turbine Wind Engines,
STEEL DERRICKS, Iron
Fence, BUCKEYE Lawn
Mowers, &c. Sandfor circular
MAST, FOOS & CO., SPRINGFIELD, O.



Brushes And
Prices to suit the trade.

Our Handled Shoe Brushes are handsomely finished and very saleable. No nails.—Handles and Top Knots are screwed on.

THE BROMWELL BRUSH & WIRE GOODS CO.,

CINCINNATI, O.

W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.
THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

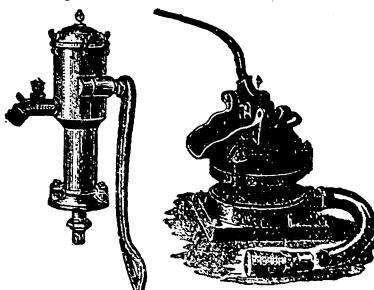
DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 208.

Fig. 281.



or wherever it is desired to raise a large quantity of water by
hand power.

The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

CAPACITY

from 3,000 to 4,500 gallons per hour.

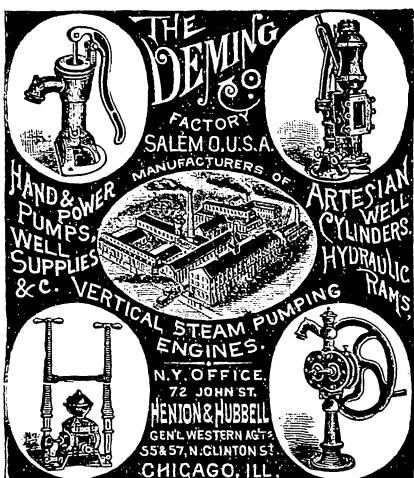
These pumps are simple, durable and low priced.
Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.

Fig. 145.

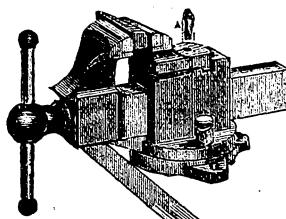


C. I. Grindstone Frame.



PRENTISS' PAT. VISES.

The Leaders for 20 Years.



Send for Illustrated Catalogue

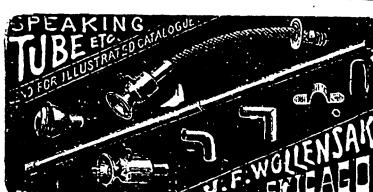
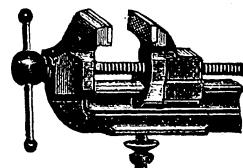
of

ALL KINDS OF VISES.

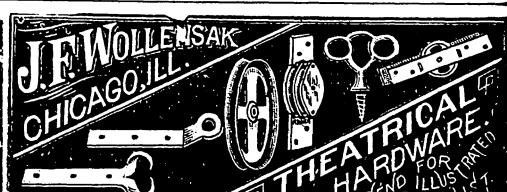
PRENTISS VISE COMPANY,

MANUFACTURERS,

44 Barclay St., New York.



SPEAKING
TUBE ETC.
FOR ILLUSTRATED CATALOGUE
J. F. WOLLENSAK
CHICAGO, ILL.



J. F. WOLLENSAK
CHICAGO, ILL.
THEATRICAL
HARDWARE.
SEND FOR
ILLUSTRATED
PRICE LIST.

F.E. MYERS & BRO.

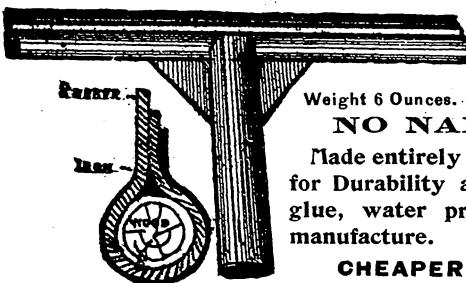


Ashland Pump and Hay Tool Works.

The New York Safety Dumb Waiter.
"The Manhattan Dumb Waiter."
"The Improved Humphrey Hand Elevator."
Made specially to be sold by Hardware Stores.
Thousands in use. Catalogues on application.

THE STORM MANUFACTURING CO.,
NEWARK, NEW JERSEY.
Formerly of Poughkeepsie, New York.

Patented January 4th, 1887.



Weight 6 Ounces.

NO NAILS. NO SCREWS.

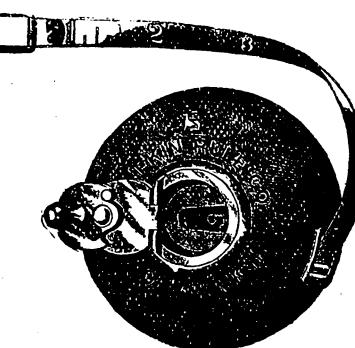
Made entirely of Galvanized Iron and is Unexcelled for Durability and Simplicity of Construction. No glue, water proof cement or shellac used in its manufacture.

CHEAPER than the CHEAPEST,
BETTER than the BEST.

THE BOURKE MANUFACTURING CO., Youngstown, O.

"RELIABLE"

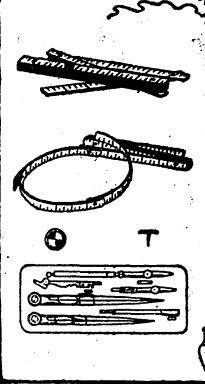
Steel Measuring Tapes.



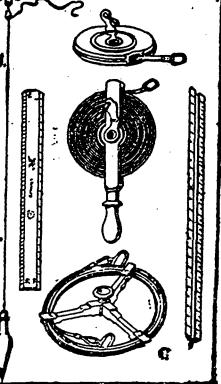
Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval. We carry a complete stock of our goods at our New York Office, 20 Murray St.

LUFKIN RULE CO., Saginaw, Mich.

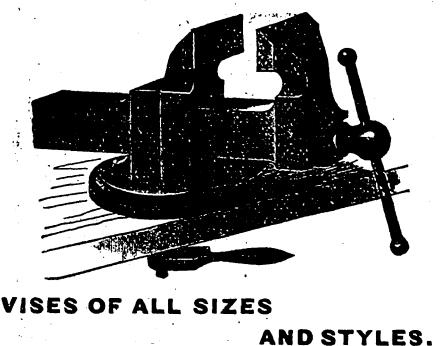
KEUFFEL & ESSER CO. NEW YORK
BRANCH: CHICAGO.
FACTORIES: HOBOKEEN, N.J.



MANUFACTURERS OF EXCELSIOR MEASURING TAPES.
SUPERIOR QUALITY, LATEST IMPROVED. GREATEST VARIETY.
STEEL, METALLIC, LINEN, POCKET TAPES.
EXCELSIOR BAND CHAINS FOR SURVEYORS, LAND CHAINS, &c.
K & E CO. FOLDING POCKET RULES.
NO WARPING, NO SHRINKING, NO ILLEGIBLE JOINTS, NO BULK.
2, 3, 4, 5, 6, 8 FOOT, ALSO WITH PATENT SPRINGS.
FLAT & TRIANGULAR BOXWOOD SCALES, BEST MADE.
PLUMB BOBS, THUMB TACKS, DRAWING INSTRUMENTS.
PRICE LISTS & QUOTATIONS PROMPLY SENT.



IRON INSTEAD OF WOOD.
GALVANIZED IRON
TUBING and CURB,
FOR
CHAIN PUMPS,
(Kegler's Patent)
Are Giving Universal Satisfaction,
BECAUSE:
They do not rust and accumulate filth—always clean. Extreme lightness is combined with strength and durability. No freezing. No waste of water by reason of enlarged reservoir at top of tubing. No annoying wheel at bottom. Easy to handle.
Tubing weighs less than $\frac{1}{4}$ lb. per ft., is connected by couplings and can be attached to any make of curb.
Send for Catalogue.
Bellevue Pump Co., Bellevue, Iowa.

VISES OF ALL SIZES
AND STYLES.

ATHOL MACHINE CO.,
ATHOL, MASS., U. S. A.

SEND FOR CATALOG.



Hollands Mfg. Co.,
ERIE, PA.,
Manufacturers all
styles VISES.

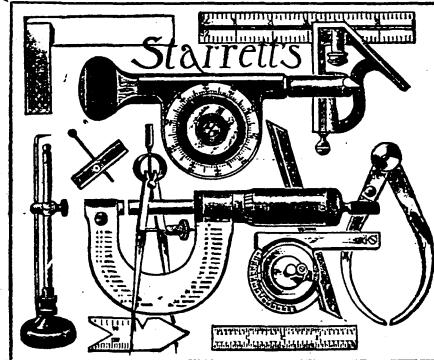


Skilled mechanics prefer them

Live dealers sell them

STARRETT'S

Best
in
work-
manship
Finest
in
finish
Latest
in
improve-
ments



For
all
workers
in
metal
or wood
Every
tool
warranted
satisfac-
tory

FINE TOOLS

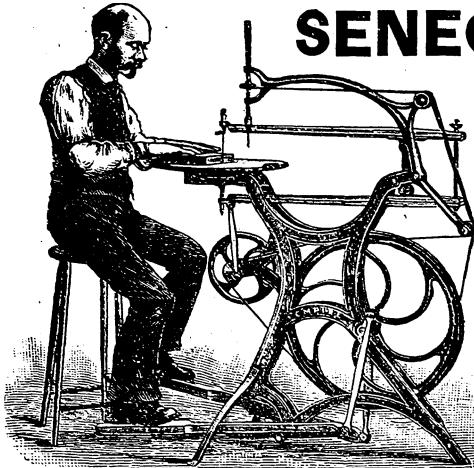
Send for Catalogue

L. S. Starrett, Athol, Mass.

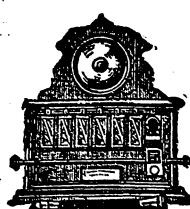
SENECA FALLS

Foot and Hand Power

- Screw Cutting Lathes
- Wood Turning Lathes
- Scroll & Band Saws
- Jig & Circular Saws
- Moulders
- Mortisers
- Etc., Etc.

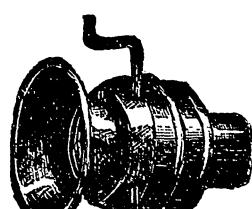


FOR SALE BY
A. J. Wilkinson & Co., 180 to 188 Washington St., Boston, Mass.,
At Manufacturer's Prices.



W. R. OSTRANDER & CO.,
204 FULTON STREET, NEW YORK,
Manufacturers of
SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC
MECHANICAL AND PNEUMATIC ANNUNCIATORS
AND BELLS.

Complete outfit of Speaking Tubes, Whistles, Electric, Mechanical and Pneumatic Bells. A full line always in stock. Send for new catalogue. Factory, DeKalb Ave. near Knickerbocker, Brooklyn, N.Y.



GEO. N. CLEMSON, PRES.

S. S. BATTIN, Vice-Pres.

ROBERT J. JOHNSON, Treas.

F. B. EARLE, Sec.

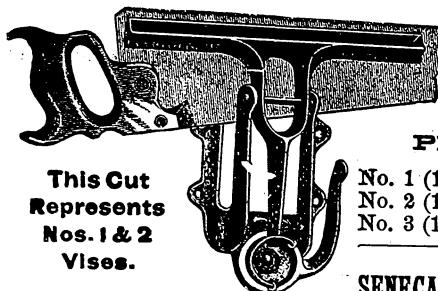
THE NATIONAL SAW CO., OPERATING SAWS

Wheeler, Madden & Clemson Mfg Co., Woodrough & McParlin, Richardson Brothers, Harvey W. Peace Co., Monhagen Steel Works, Woodrough & Clemson, Pennsylvania Saw Co.

SEND FOR PRICE-LIST.

GENERAL OFFICE:
NEWARK, - - New Jersey,

WENTWORTH'S PATENT NOISELESS SAW VISES, WITH RUBBER CUSHIONED JAWS.



This Cut
Represents
Nos. 1 & 2
Vises.

Prevent all vibration and render Saw Filing noiseless.
Will make no more noise than Filing on a Solid Piece of Iron.

Have a Larger Sale than All Other Kinds Combined.

PRICE LIST.

	PER DOZ.
No. 1 (11 inch Jaws),	\$15.00
No. 2 (15 inch Jaws),	21.00
No. 3 (11 inch Jaws),	18.00

LIBERAL DISCOUNT TO THE TRADE.

LONGEST JAWS, HEAVIEST AND
BEST FINISHED.
Sold by all leading jobbers of gen-
eral Hardware at Factory Prices.

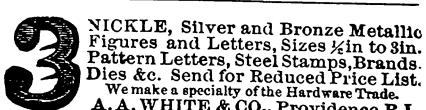


No. 3 Vise.

—MANUFACTURED BY—
SENECA FALLS MFG. CO., 265 Water St., Seneca Falls, N. Y.



WM. KROGSRUD,
Engraver and Die Sinker,
61 Fulton St., N. Y.
Manufacturer of
STEEL STAMPS
For Every Purpose.
Steel Letters and Figures.
Burning Brands, Stencils,
&c. Send for Illustrated
Catalogue.



NICKLE, Silver and Bronze Metallic Figures and Letters, Sizes $\frac{1}{2}$ in to 3 in.
Pattern Letters, Steel Stamps, Brands.
Dies &c. Send for Reduced Price List.
We make a specialty of the Hardware Trade.
A. A. WHITE & CO., Providence, R.I.

JESSE JONES & CO.,
HARDWARE
SHELF BOXES

615 & 617 Commerce St., Phila.
Send for circular and list of references.

NEW ADJUSTABLE BENCH LEVEL.

WITH GROUND AND GRADUATED VIAL.

4-6 and 8 inch.



Three Sizes.

MANUFACTURED BY

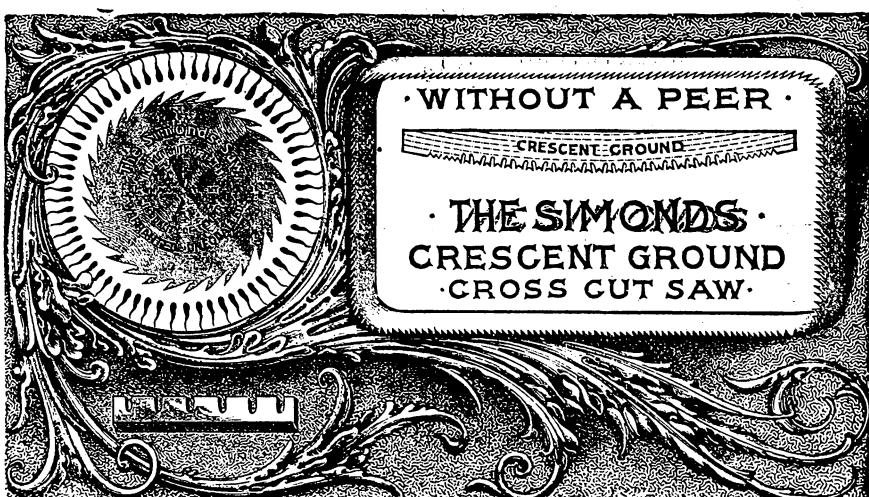
C. F. RICHARDSON & SON,
ATHOL, MASS.

CATALOGUES AND QUOTATIONS

Filed and Found without effort by our system. Simple and not expensive.
Every Buyer needs it. Every User praises it.

We also make Paper Boxes and Cartons of all kinds. We make Gummed Labels for marking Merchandise, Boxes and Drawers. Write for Circulars and Prices.

The Folding Paper Box Co.,
SOUTH BEND, INDIANA.



Simonds Mfg. Co. Simonds Saw Co.,
FITCHBURG, MASS. CHICAGO, ILL. SANFRANCISCO CAL. PORTLAND, ORE.

The Taintor Positive Saw Set.

Mechanics are now inquiring for this tool, and Hardware Dealers should have them in stock, or at least have a sample.

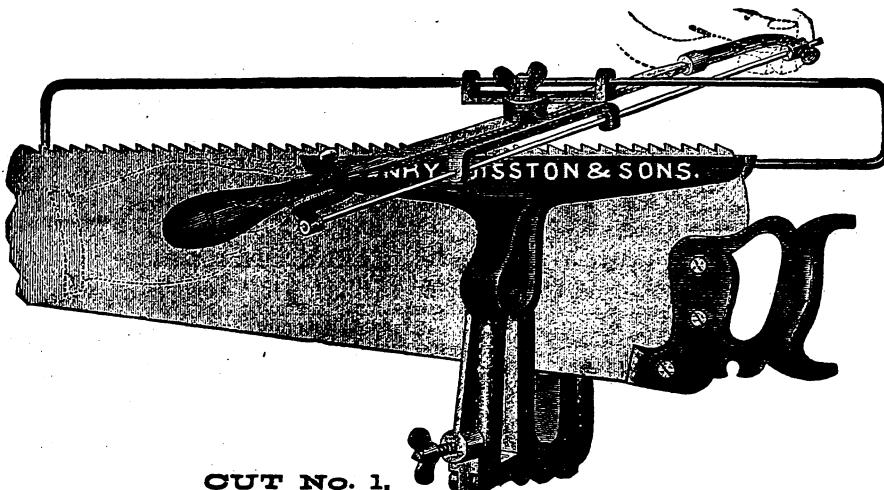
For Prices and Discounts, address

WIEBUSCH & HILGER, LTD., SOLE AGENTS,
84 and 86 Chambers Street, NEW YORK.



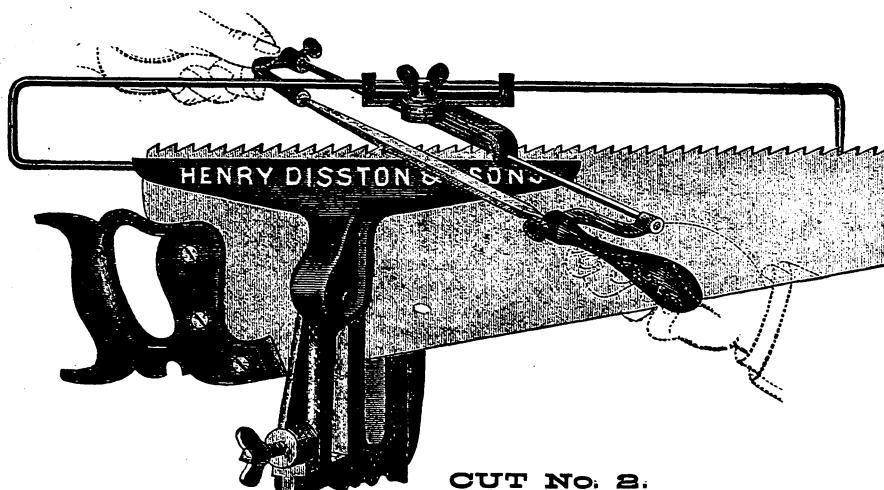
DISSTON'S Improved Saw Clamp AND FILING GUIDE.

ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART OF SAW FILING TO FILE A SAW CORRECTLY.



CUT No. 1.

Cut No. 1 shows a saw and the attachment in proper position for filing the first side; and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



CUT No. 2.

To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

This filing guide is sold only attached to our No. 3 Improved Clamp or Vise, and not sold separately. We recommend this as the best saw clamp on the market, being quickly and easily adjusted, and not liable to get out of order.

Write for price including No. 3 Clamp, Filing Guide, File and Handle complete: Packed one in a wooden box.

Henry Disston & Sons, Philadelphia, Penn.

ARCADE FILE WORKS.



WARRANTED FILES AND RASPS.

EASTERN OFFICE,
NEW YORK.

FACTORY
ANDERSON, IND.

WESTERN OFFICE.
CHICAGO.

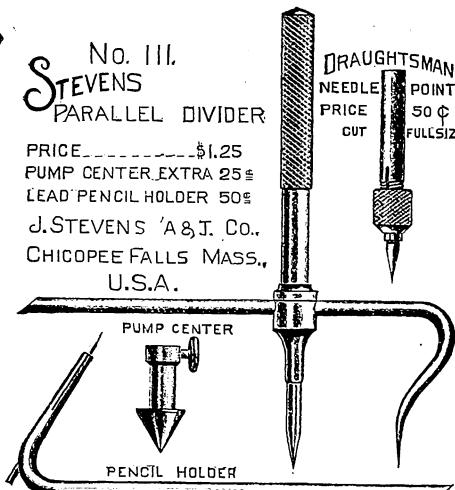
THE FILES THAT LEAD THEM ALL

THE BEST EQUIPPED FILE WORKS IN THE WORLD.

"The fact that the Arcade File Works alone use the improved File Machinery recently invented by Alfred Weed, and the even heat of natural gas, enables them to produce files that cut faster and wear longer than any on the market."

STEVENS' PARALLEL DIVIDER.

No. III.
STEVENS
PARALLEL DIVIDER
PRICE \$1.25
PUMP CENTER EXTRA 25¢
LEAD PENCIL HOLDER 50¢
J. STEVENS & J. CO.
CHICOPEE FALLS MASS.
U.S.A.

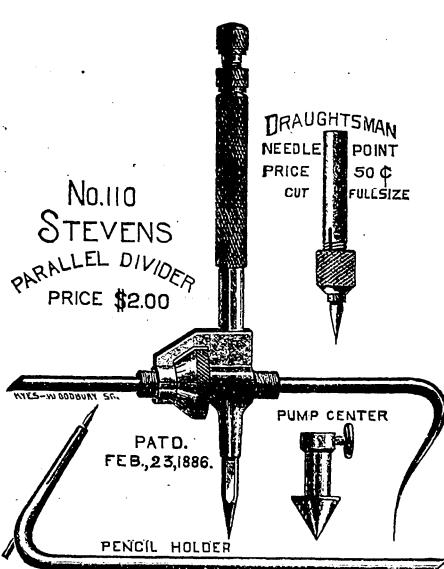


ONE HUNDRED
VARIETIES OF
Finest Mechanical Tools.

CATALOGUE FREE.

J. Stevens Arms & Tool Co.,
P. O. BOX 5729,
Chicopee Falls, Mass.

No. 110
STEVENS
PARALLEL DIVIDER
PRICE \$2.00
DRAUGHTSMAN NEEDLE POINT 50¢ FULLSIZE



Warranted Better than the Best

ESTABLISHED 1843.
MORE THAN 200 DIFFERENT PATTERNS.

ENGLISH ANVIL

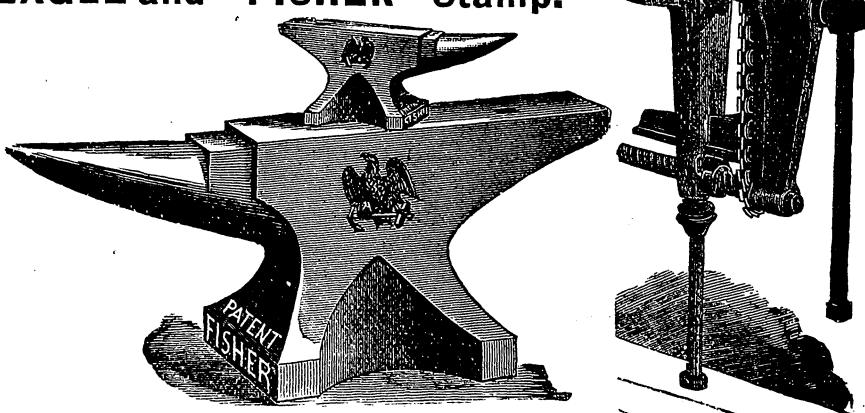
Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in the United States fully warranted as above.

FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

None Genuine without our Trade-Mark.

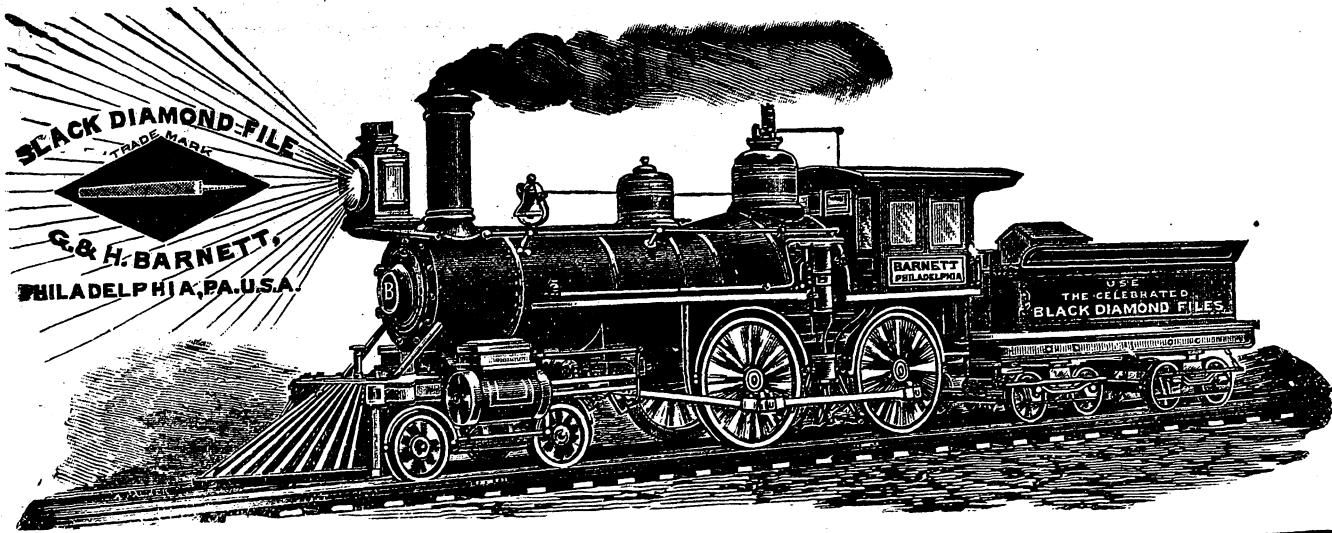
EAGLE and "FISHER" Stamp.



EAGLE ANVIL WORKS,

Trenton, N. J.

Sold in New York by our Agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfr. Co., 45 Chambers St.



THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

NICHOLSON FILE CO.

PROVIDENCE, R. I.

3000 VARIETIES FILES
[X.F.] AND INCREMENT CUT FILES

J. M. KING & CO., WATERFORD, N. Y.

Manufacturers of
BUTTON'S

Pat. Wire Cutter AND PLIER COMBINED.

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

Established by DANIEL B. KING, 1829.



McCaffrey File Co.,
FIFTH and BERKS STS.
PHILADELPHIA, PA.



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

BEST
CRUCIBLE
STEEL.

"TROJAN" HORSE RASPS AND FILES.

LOWEST
IN
PRICE.
LET
US
QUOTE

—
STRONGEST
TOOTH.
BANKER & WHITE,

(Troy File Works.)
N. Y. Agent GEO. M. MATTESEN, 111 Duane St.

**HOWARD IRON WORKS,
BUFFALO, N. Y.,**
Manufacturers of

BOLT CUTTERS
AND NUT TAPPING MACHINES,
(Schlenker's Patent),
Send for Illustrated Catalogue.

JOHN LOYD,

Machine Knives, Shear Blades,
Presses and Dies.

NOS. 558 to 562 Water Street, New York.



John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation, for superiority, against all Competitors, from

THE YEAR SEVENTEEN HUNDRED & FIFTY,

and are still in increasing demand. As in the past, it is the unalterable DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.

WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.

SOLE AGENTS FOR THE UNITED STATES, AND THE CANADAS.

Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.

Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL MADE, FROM GOOD MATERIALS BY

A. J. Phillips & Co., Fenton, Mich.

The Amidon Tool Corporation,

Manufacturers of

A Complete Line of

Bit Braces

1451 Niagara St., Buffalo, N. Y.



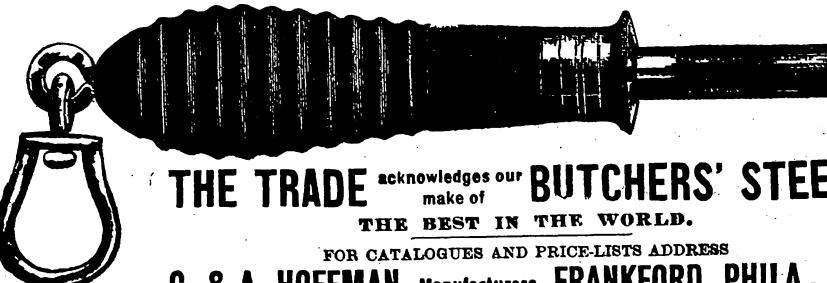
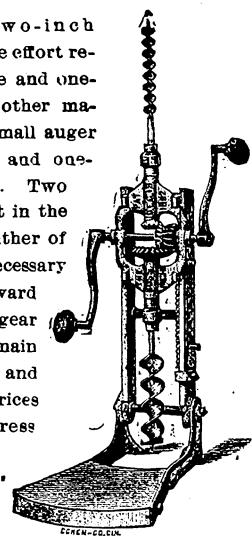
CORNER BRACE.

The Boss 2-speed Boring Machine.

Will operate a two-inch auger with the same effort required in using one and one-half inch in any other machine, and for the small auger have a speed two and one-half times faster. Two augers may be kept in the machine, to use either of which it is only necessary to point it downward by first taking the gear frame out of main frame, inverting and replacing it. For prices and discounts address

Buckeye Mfg. Co.

Union City, Ind.



THE TRADE acknowledges our make of **BUTCHERS' STEELS**

THE BEST IN THE WORLD.

FOR CATALOGUES AND PRICE-LISTS ADDRESS

C. & A. HOFFMAN, Manufacturers, **FRANKFORD, PHILA., PA.**

ESTABLISHED 1816.

WHITE, VAN GLAHN & CO..

15, 16 and 17 CHATHAM SQUARE, N. Y..

Dealers in **GENERAL HARDWARE.**

SOLE AGENTS IN THE U. S. FOR THE CELEBRATED

J. B. Addis & Sons' Wood Carvers' Tools.

EMPIRE WINDOW SCREENS AND DOORS WITH PATENT FLY ESCAPE.

"Van Glahn" and "Gem" Lawn Mowers, Barb Wire, Green Wire Cloth, Poultry Netting, Farming Tools, Etc.

WRITE FOR PRICES.

SHARP TOOLS are a NECESSITY to a good workman,

But without a GOOD WHETSTONE they are an impossibility.

That is why it is always economy to buy

PIKE'S WHETSTONES.

Pike's Indian Pond Scythe Stone, Strong, Sharp Grit, Quick Cutting.

Scythe Stones.

Oil and Water Stones.

GREEN MOUNTAIN,
LAMOILLE,
BLACK DIAMOND,
PREM. QUINNEBAUG,
WHITE MOUNTAIN,
GENUINE RAGG,
WILLOUGHBY LAKE.

WASHITA,
ARKANSAS,
HINDOSTAN,
WATER-OF-AYR,
RAZOR HONES,
TABLE HONES,
AXF STONES, ETC.

THE PIKE MFG. CO., - Pike Station, N. H.

SICKELS, SWEET & LYON,

Wholesale Hardware.

Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

Carry Stock of Jackson, Mich., Farming Tools

Shipments from Factory if preferred.

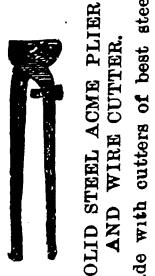
N. Y. AGENTS FOR

Cortland Door and Window Screen Co., Union Steel Screw Co., Eagle File Co., Perfection and New Easy Lawn Mowers.

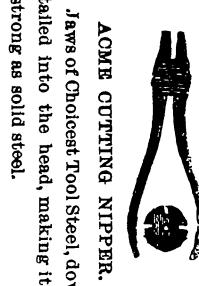
Spring Catalogue No. 7 issued in February.

HICCANUM HARDWARE CO., HICCANUM, CONN.

New York Office, 18 Cliff Street.

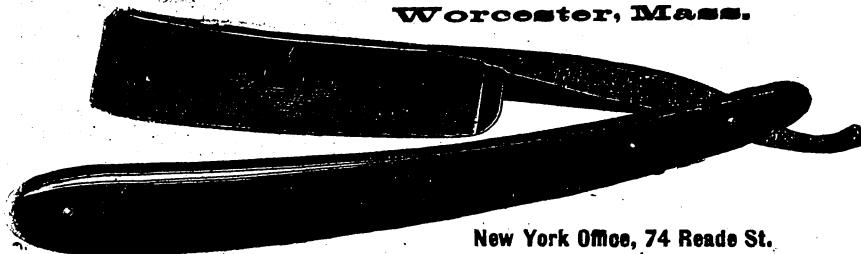


Made with cutters of best steel.



Jaws of Choicest Tool Steel, dovetailed into the head, making it as strong as solid steel.

J. R. TORREY RAZOR CO.,
Worcester, Mass.



New York Office, 74 Reade St.

Our Razors have become the standard for excellence and are no higher in price than the foreign. We manufacture and carry in stock more than 200 styles. Send for illustrated catalogue.

"Stamped with the BUCK'S HEAD."

BUCK BROTHERS,
MILLBURY, MASS.

The Most Complete Assortment in the U. S. of
Shank, Socket Firmer and Socket Framing
Chisels, Fine Bevel Edge Chisels, Plane Irons.

TWO PRIZE MEDALS,

No. 1098 and No. 1099, AT WORLD'S FAIR.



TRADE-MARK

TRADE-MARK.

Buyers are cautioned against any parties who claim a recent connection (or any connection for over 20 years) with Buck Bros., or who represent goods as our make not stamped with the BUCK'S HEAD or BUCK BROTHERS in full.

1825
R. HEINISCH.

1871
R. HEINISCH'S SONS.

1892
R. HEINISCH'S SONS CO.

CAUTION.
TO ALL PURCHASERS OF THE

WELL KNOWN HEINISCH BRAND OF

Shears, Trimmers, Scissors, Tinnery Snips, &c.

All Goods of our Manufacture are Stamped

R. HEINISCH

OR

R. HEINISCH

NEWARK, N.J.
U. S. A.

NO OTHERS ARE GENUINE.

NEW YORK OFFICE AND SALESROOM,
90 CHAMBERS ST.

R. HEINISCH'S SONS CO.,
NEWARK, N. J., U. S. A.

HIGHEST AWARD PARIS EXPOSITION, 1889.

ESTABLISHED 1837.
INCORPORATED 1892.

THE L. & I. J. WHITE CO.,

MANUFACTURERS OF

EDGE TOOLS.

Coopers', Carpenters' and Ship Tools, Plane Irons,
Cleavers, &c. Full Line Chisels.

1853
Highest Awards at the World's Exposition
for Superior Tools.

CHARLES BUCK,
sole surviving member of the original firm of BUCK BROS., and
proprietor of the
MILLBURY EDGE TOOL WORKS,
MILLBURY, MASS.,
Manufacturer of the

GENUINE STANDARD BUCK TOOLS

All kinds of Shank, Socket Firmer Chisels and Gouges,

Cut and Double Irons, S. D. Bits, etc. Send for Catalogue.

CAUTION.—Buyers wanting the standard Buck Tools will see
that they get only those stamped CHARLES BUCK when
ordering from the jobbing houses. Address all correspondence to

CHARLES BUCK or the

MILLBURY EDGE TOOL WORKS, MILLBURY, MASS.

CHARLES BUCK,
The only surviving Member of the
Original firm of Buck Bros. Estab. 1853.

Cast Shears.

ACME SHEAR CO.,

BRIDGEPORT, CONN.

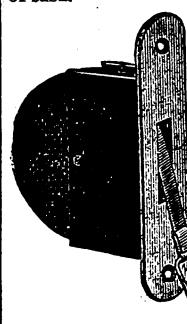
8 Years' Experimenting

Gives us many advantages over all others in
producing the only

Steel Frame Sash Balance

Made in the U. S. It is the most durable device
ever invented for counter balancing the weight
of sash.

**NO POCKETS OR
BOXES REQUIRED.**



Can be used in
old as well as new
houses. Warranted
15 years.

Write for Illustrated
Price-List.

PULLMAN SASH BALANCE CO., Rochester, N. Y.

New York Office, 142 Chambers St.
Chicago Office, 235 Lake St.

IF YOU WANT THE BEST
SOAP MAN BRITANNIA SPOONS
FOR CATALOGUE & PRICES.
THEIR MAKE IS EQUAL EAST & WEST
IF NOT SUPERIOR. SOADAM & SON
TO ANY OTHER. SOADAM & SON
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
SOAP MAN NICKEL SILVER SPOONS
FOR CATALOGUE & PRICES.
THEIR MAKE IS EQUAL EAST & WEST
IF NOT SUPERIOR. SOADAM & SON
TO ANY OTHER. SOADAM & SON
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
SOAP MAN SILVER PLATED SPOONS
FOR CATALOGUE & PRICES.
THEIR MAKE IS EQUAL EAST & WEST
IF NOT SUPERIOR. SOADAM & SON
TO ANY OTHER. SOADAM & SON
HAVE BEEN IN BUSINESS SINCE 1840.

CUTLERY

Will mark price &c.,
on cutlery.

ENAMEL

Guaranteed not
to rust.

Flows from Pen as readily as ink.
FREE BY MAIL, 50 CENTS.

A. B. SHIPLEY & SON, 503 Commerce St.,
Philadelphia, Pa.

AMERICAN TOOL COMPANY,

NEW YORK,

MANUFACTURERS OF

TOOL CHESTS

of all sizes, complete with tools, for Hardware, Toy,
Notion and Variety trades.
Factory and Salesroom,
200 West Houston Street, near Varick.
Also Machinists' Tool Chests, empty. Illustrated Cata-
logue and prices furnished on application.

Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL
MADE, FROM GOOD MATERIALS BY

A. J. Phillips & Co., Fenton, Mich.

THE LATEST.



We have a full line of above, which is the neatest pattern ever presented to the trade, and it is stamped



NONE GENUINE WITHOUT THIS TRADE-MARK.

WM. ROGERS MFG. CO., Offices, Hartford, Conn.
FACTORIES HARTFORD, CONN., NORWICH, CONN., AND TAUNTON, MASS.

SILVER PLATED KNIVES AT REDUCED PRICES.



WINDSOR. PLAIN HANDLE.



WINDSOR. ARAB HANDLE.

Combination Sets, 6 Knives and 6 Forks, in Satin Lined Case, at same price as Knives.

—SEND FOR PRICES.—

THESE PATTERNS AT SPECIAL FIGURES.

An opportunity for the Hardware Dealer. Offer not repeated this season.

Full 12 dwt. Stamped our name and trade-mark.

THE HOLMES & EDWARDS SILVER CO., — BRIDGEPORT, CONN.

NORTHAMPTON CUTLERY COMPANY, NORTHAMPTON, MASS.

NEW YORK
SALESROOM,

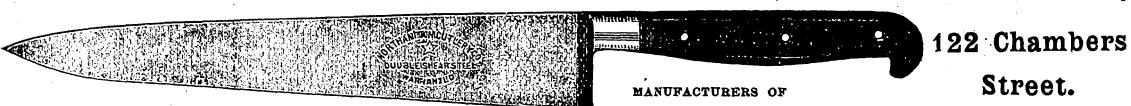
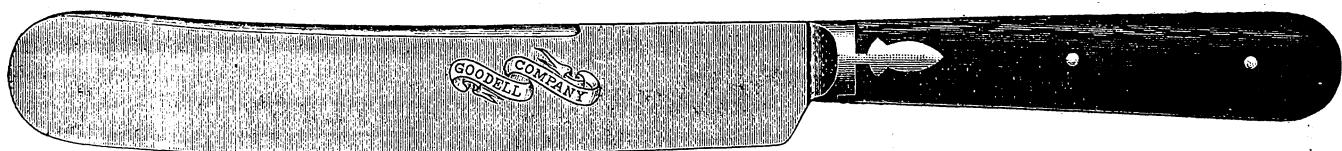


TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.

Send for Revised Catalogue.

GOODELL COMPANY, ANTRIM, N. H.



— : MANUFACTURERS OF : —

Table Cutlery, Butcher Knives, Carvers, Shoe Knives, Butcher Steels, &c., &c.

The quality and finish of our goods is unsurpassed. Our prices are suited to the times. Our new catalogue will be ready for distribution April 1st. Send for one if desired.

AGENTS

THE ALFORD & BERKELE CO., 77 Chambers St., N. Y. City.

HENRY KEIDEL & CO., Baltimore, Md.

— REMEMBER —

WE MAKE ONLY

The Very Highest Grade
OF
MECHANICS' TOOLS.

H. H. MAYHEW CO., Shelburne Falls, Mass.

— THE ART OF SELLING. —

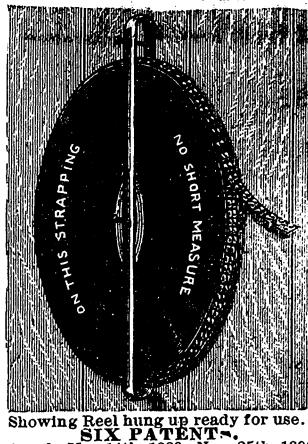
By F. B. GODDARD.

12mo. Flexible Cloth, 50 Cents.

In this book the author lets the reader into the secrets of the accomplished and successful salesmen, illustrates his tact and finesse, and tells how he masters men; but beyond this, the work embraces much information which will be instructive and useful to all classes of business men. Besides suggestions to buyers, it contains chapters on "Changes in Business Conditions and Methods," "Salesmen's Compensation," "Retail Merchants and Salesmen," "Saleswomen," "How to Read Character," with a collection of clearly and tersely put important Legal Principles and Decisions Governing Sales. Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS, Publisher & Bookseller, 96-102 Reade St., N. Y.

PATENTED IN ALL COUNTRIES.



INJUNCTION NOTICE.

THE U. S. COURT SAYS IN ITS DECISION :

The defendant admits making and selling Box Straps which clearly contain CARY'S PATENTED INVENTION, although the "Bosses" are shaped differently than those shown in the drawings. "Injunction granted."

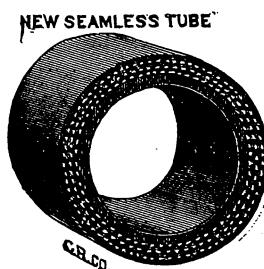
All Goods put up in this style to be genuine must bear the name of the CARY MANUFACTURING CO., stamped on each reel.

CARY MANUFACTURING CO., 5 to 9 Elm St., NEW YORK.



This is a fac-simile of the label on my VULCAN TOOL CO. brand of HATCHETS; a brand for which I have a regular trade in some sections, but to those who have not "caught on"—dealers who are handling an outside brand—I offer a limited quantity at a very low price. Inquiries for price solicited.

FAYETTE R. PLUMB, Philadelphia.



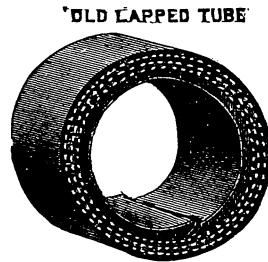
Who Has Not Had Bad Hose ?

Who has not lost time, patience, money, by attempting settlement for such goods?

THE CAUSE in nine cases out of ten is the lapped seam.

THE REMEDY is in buying our

PATENT SEAMLESS TUBE HOSE,
made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.



SALES OF
Over Two Million Feet
—OF—

GARDEN HOSE
alone during the past year,
distributed throughout
the United States, and not a
single piece complained of,
justifies us in guaranteeing
that it will give absolute
satisfaction.

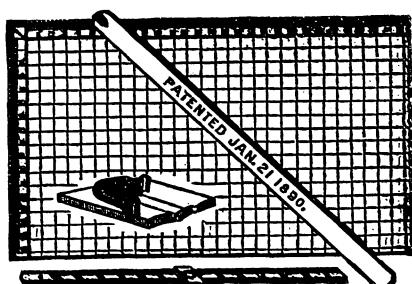
Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers', Cotton Hose, &c.
Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

CLEVELAND RUBBER WORKS
of the Mechanical Rubber Co.,
CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

We were awarded an order of 25,000 ft. for World's Fair
of our celebrated
**Seamless-Tube
COTTON RUBBER-LINED HOSE**

We Want Your Trade.
Send for 60-page Catalogue.
Write for Prices and Samples.



The Canton Glass Board.

Cuts any Fraction of an inch by Eighths.

Unequaled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

—ALSO—

IMPROVED TRAMMEL RULE for Cutting Circles

From 3 inches up to 48 inches, Segments, Gothic Shapes, &c.

Send for Circular.

The Canton Saw Co., Canton, Ohio.

American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.
Factory, 103 to 119 N. 3d St., Brooklyn, E. D. N. Y.

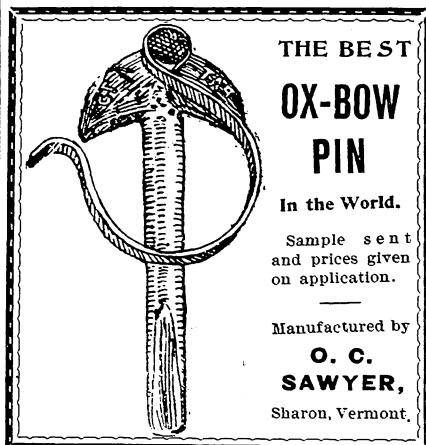
Notes on the Construction of Cranes and Lifting Machinery. By EDWARD C. R. MARSH. 118 Illustrations. 12mo, cloth..... \$1.00
For Sale by David Williams, 96-102 Reade St., N. Y.

—: OUR :
PURE ALUMINUM COOK-
ING UTENSILS

Meeting with such universal appreciation, we think it to our interest to appoint ONE responsible firm of Hardware Merchants in EACH town and city as our sole agents.

ILLINOIS PURE ALUMINUM CO.,
LEMONT, ILLINOIS.

Manufacturers of Sheets, Medals, Utensils



THE BEST

**OX-BOW
PIN**

In the World.
Sample sent
and prices given
on application.

Manufactured by
**O. C.
SAWYER,**
Sharon, Vermont.

**PHILLIPS
SCREENS**

Are Reliable.

DAME, STODDARD & KENDALL,

374 Washington St., Boston, Mass.

IMPORTERS, MANUFACTURERS' AGENTS AND JOBBERS OF FINE FISHING TACKLE.

OUR LEADING SPECIALTIES ARE:

Skinner's Celebrated Fluted Trolling Spoons.

Patent Adjustable Floats and Sinkers.

Bray Fly Books.

"Neverbreak" Split Bamboo Rods.

"Neverbreak" Braided Silk Lines.

Crosby's Hunting Hatchets.

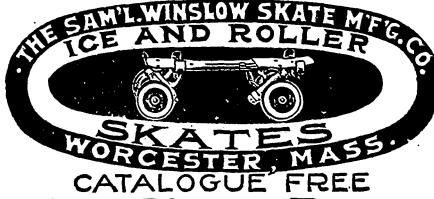
Littlefield's Collapsing Net Ring and Staff,

The Latest and Best Ring on the Market.

SEND FOR OUR NEW CATALOGUE.

THE SAMUEL WINSLOW SKATE MFG. CO.,

Worcester,

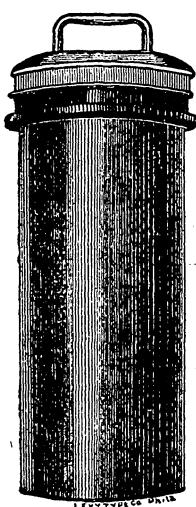


Mass., U. S. A.

The most extensive Skate Factory in the World.

Are You Interested

—IN—



**ICE CREAM
STORAGE
CANS**

At Bottom Prices?

IF SO WRITE

US

The Stuart & Peterson Co..

Burlington, N. J., U. S. A.

HOLLOW WARE MANUFACTURERS.

**PHILLIPS
SCREENS**
are Reliable.

It Don't Matter

to you, perhaps, what Tack Puller you sell, so it pays a profit. How about your customer? Can you retain his trade and satisfy him with less than "the best?" There is only one kind that "is the best," and we call it the Columbia Tack Puller. It alone satisfies the user. We manufacture them and will gladly quote prices.

SPECIALTY MANUFACTURING CO., Hartford, Conn.

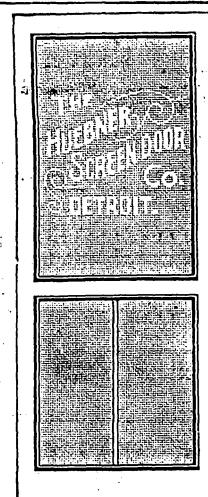
**IRON RESERVOIR
VASES.**



Nearly 100
styles and
sizes.
List prices
from \$6.00
to \$100.00
each.

These Vases are made with a reservoir for water, from which a constant and even supply of moisture is drawn by capillary attraction, and they do not need watering often than once in ten or fifteen days. Thousands of Reservoir Vases are in use on lawns and in cemeteries all over the country. Our prices are no higher than those of ordinary vases.

Catalogue sent on application.



THEY are made of Michigan Pine Lumber. The Stiles are mortised and are four inches wide. They are hand painted with a walnut-colored varnish, and covered with the best Wire Cloth. The finish, material and workmanship is first-class in every respect. Crated $\frac{1}{2}$ doz. in a package.

The Huebner Screen Door Co., Detroit.



SELLS AT SIGHT!
GET THE BEST!
Fast selling, always gives satisfaction. No weight on horse. Worth twice the cost for convenience in hitching up. Agents wanted. Send stamp for circular. Price, \$1.50. State rights for sale.

THE DECATUR SHAFT SUPPORT CO.

Decatur, Ill.

**WALBRIDGE & CO.,
BUFFALO, N. Y.**

The Iron Age Standard Hardware Lists for use in Price Books. Compiled by R. R. WILLIAMS, Hardware editor of The Iron Age. Second edition revised.....\$0.25
For sale by David Williams, 96-102 Reade St. N. Y.

For Sale by
the

Hardware Trade.

The Enterprise Mfg. Co. of Pa.,

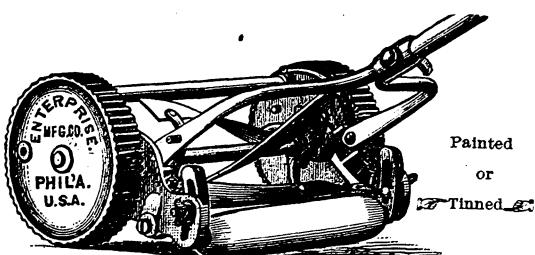
THIRD and DAUPHIN STS., PHILADELPHIA, PA.

Send for
Catalogue.
Free.

ENTERPRISE LAWN MOWERS,

7, 9, 11, 13, 15 INCHES.

3
or
5
Blades.

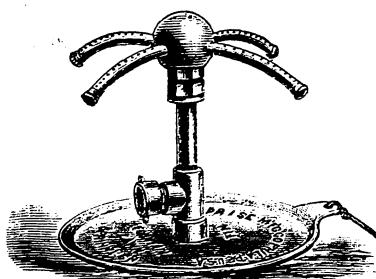


Painted
or
Tinned.

Equal to the best in the market.
Prices quoted on application.

ENTERPRISE Lawn Sprinklers.

Finished
in a
Superior
Manner.



Muddy
Water
does not
Interfere
with it.

No well kept Lawn complete
without one.

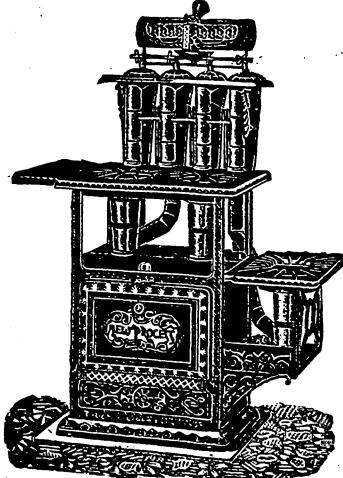
Cooking Made Easy!

—BY THE—

"New Process" (Evaporating) Stove

LIGHTS LIKE GAS.

Consumes less gasoline than any other vapor stove made. No waste when not cooking. No heat when not in use. No overheated kitchen.



More than a quarter million in use in the United States.

More than 20,000 enterprising dealers selling them.

Bakes Better and Costs less than any Coal or Wood Range.

Saves both Time and Money. No Soot, no Dirt, no Ashes.

Send for Illustrated Catalogue, giving full particulars to

THE STANDARD LIGHTING CO.,

600-620 Perkins Avenue, Cleveland, Ohio.

Dangler Electric Torches

FOR
GASOLINE
OR
OIL.

14 JETS OF LIGHT



3 to 6
INCHES
LONG.

FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

The Dangler Stove & Mfg. Co.,
Cleveland, Ohio.

A practical means of rapidly reaching absolutely accurate results without the mental wear of computing.

LADD'S DISCOUNT BOOK.

It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$3.00; Double Indexed Edition, \$4.00.

Mailed, postpaid, upon receipt of price by DAVID WILLIAMS, 98-102 Beale Street, New York.

"Originators of Steel Hollow Ware."
"PIONEERS OF HEAVY METAL STAMPING."

8 "AVERY"
"AVERY"
"STEEL SPIDER"
POLISHED-TINNED-
ENAMELED
"SILVER STEEL"
HOLLOW WARE
ALL KINDS OF
HEAVY and LIGHT STAMPING, BLANKING, &c., &c.

THE AVERY STAMPING CO., CLEVELAND, O.

CLEAN and WHOLESOME.





To Make a Bull's Eye

In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a HIT by sending for the IDEAL HAND BOOK.

IDEAL MFG. CO., New Haven, Ct., U. S. A.

Please mention *The Iron Age* when you write.



Bicycle Locks.

Bicycle Bells.

Especially Low Prices.

We manufacture hardware specialties of all descriptions to order.

HAINES & ZIMMERMANN, 407 Cherry St., Phila

HEATH'S

BALL VALVE PUMP
AND
UNIVERSAL COUPLING,
For Bicycle and Sulky Wheels.

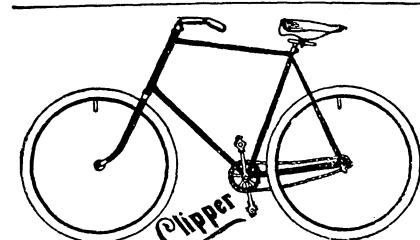
The handiest, windiest, strongest pump in the world at any price.

Price \$2.00.

Liberal discount to the trade.

Manufactured by

S. F. HEATH CYCLE CO.,
Minneapolis, Minn.



Clipper Bicycles

are built to please the dealer and rider.

Are you in the bicycle business? If not, you can make it pay to handle Clippers. Buy direct from the manufacturer and save the jobbers' profit. It will add considerable to your bank account. We want responsible dealers only. We may be able to interest you, in fact we are sure of it. Our policy is a protective one, and will please you. It protects against Scalpers and "Curb Stone Brokers."

Grand Rapids Cycle Co.,
Grand Rapids, Mich.

LOVELL DIAMOND CYCLES.

HIGHEST GRADE.

All Sizes and Prices. See our line before you purchase.

All the Latest Improvements.

FULLY GUARANTEED.

JOHN P. LOVELL ARMS CO., M'f'rs,
BOSTON, MASS.

SEND FOR CATALOGUE, FREE TO ALL.

AGENTS WANTED.

Do you want to buy Bicycles CHEAP?

If so, write to us for prices on the Falcon No. 1, Falconess, Falcon Junior (boys' bicycle) and Hackney.

THE W. BINGHAM COMPANY,
CLEVELAND, OHIO.

DO YOU HANDLE BICYCLES ? IF NOT, WHY NOT ?

Handle
the
Bicycle
that is a
Money
Maker.

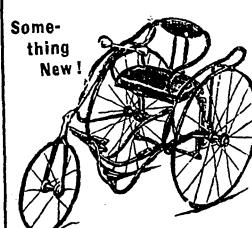
(The) **Addington** Is a Sure
Winner!

2 SIZES. No. 1, \$125.00, Weight 28 lbs.

No. 2, \$100.00, Weight 31 lbs.

Write for Terms and Discounts to Agents.

STOKES MFG. CO., Makers, - 298 Wabash Ave., Chicago.
WESTERN BRANCH, UNION CYCLE MFG. CO.

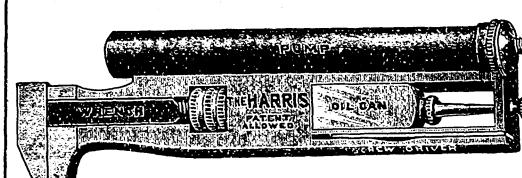


THE "PERFECTION" Ball Bearing Girls'

Run as easily as Bicycles. Cost about the same as old style parallel bearings. Sold by Hardware and Toy Jobbers. Manufactured by

The Toledo Metal Wheel Co., Toledo, O. Tricycles.

HARRIS COMBINATION WRENCH.



*Wrench, Oil Can, Screw
Driver and Pump all
combined in one.*

Made of drop forged steel, case hardened; weight, 10 ounces or 3 ounces less than all the other tools separate.

Electrotypes on Application. Send for Descriptive Circular.

HARRIS MANUFACTURING CO.,

381 Main St., Buffalo, N. Y.



Every Year

the "STERLING" becomes more popular with dealers. They find it gives better satisfaction than any other wheel. No worry over repairs.

THE STERLING

(Built like a Watch.)

A wonderful, strong, light wheel, with a dozen points of superiority over all others. Our "new departure" catalogue (free) tells all about it.

STERLING CYCLE WORKS.
234 Carroll Ave., CHICAGO.



A Line of Hardware

Is not Complete Without

MONARCH BICYCLES.

They will make you more money than anything you can handle.

At the World's Columbian Exposition they received a general award for all points, including

Design, Workmanship and Finish.

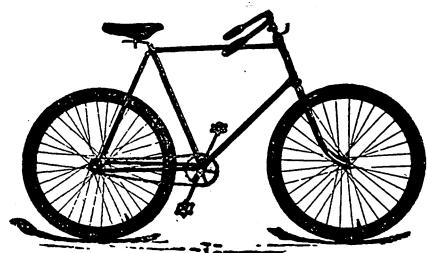
Prices, \$90.00, \$100.00, \$125.00.

Weights, 25 to 34 pounds.

Send for twenty-four page catalogue.

MONARCH CYCLE CO., Lake & Halsted Sts. Chicago, Ill.

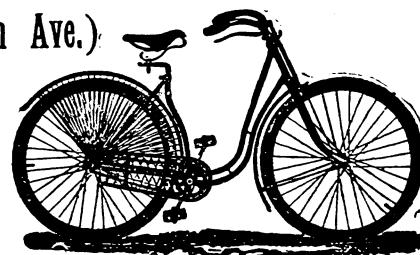
(Retail Salesroom, No. 280 Wabash Ave.)



C. F. GUYON CO.,

Nos. 97 and 99 Reade St., New York,

Genl. Eastern Distributing and Sales Agents.



THE CRAWFORD MFG. CO.

MAKERS OF

HIGH GRADE AND JUVENILE

BICYCLES,

FACTORY, HAGERSTOWN, MD.

NEW YORK OFFICE, 72 READE STREET. L. B. Whymper, Mgr.

9/10 Of the good ideas of the world go to the wall because they LACK COMPLETION.

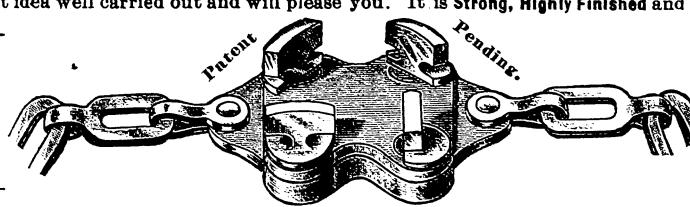
THE GOODHUE COMBINATION LOCK

is a bright idea well carried out and will please you. It is Strong, Highly Finished and a Sure Lock.

No

Two

Alike.



No

Key

Required.

Can't be beat for use of Cyclists, Traveling Men, to secure Pleasure Boats, &c. Easily operated in the dark. List price, \$1. Liberal discount to dealers. Manufactured and sold by

THE INDEPENDENT ELECTRIC CO., - . . 39th St. and Stewart Ave., Chicago.

PARKHURST & WILKINSON, General Western Agents.

WE ARE HEADQUARTERS ON

Plated Knives, Forks, Tea Spoons, Table Spoons, Dessert Spoons, Coffee Spoons, Bar Spoons, Julep Strainers, Ice Cream Spoons, Orange Spoons, Sugar Shells, Butter Knives, etc., etc., etc.

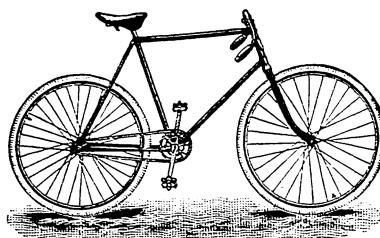
Our unplated nickel silver goods, light and heavy, are the best in the market, so our customers say, and they ought to know.

Write us for Prices and be Convinced.

KELLEY & McBEAN, Niagara Falls, N. Y.

Remington

Cycles.

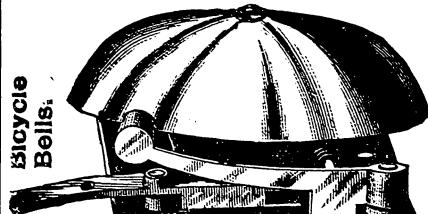


In Design, Workmanship, Material and Finish they are BEST.

SEND FOR CATALOGUE.

Remington Arms Company

313-315 Broadway, New York.



BEVIN BROS. MFG. CO., Easthampton, Conn.
Manufacturers of

Sleigh Bells, House, Tea, Hand, Gong Bells, &c.

MAGICAL EXPERIMENTS; OR, SCIENCE IN PLAY.
By ARTHUR GOOD. Translated by CAMDEN CURWEN and ROB WATERS. The experiments explained include some designed merely for recreation, with many really scientific in character. These latter are given with a view of stimulating an interest in the study of physics. 329 pages, illustrated, 8vo, cloth, \$2.00
For sale by David Williams, 96-102 Reade St., N. Y.

CHANTRELL TOOL CO.,

MANUFACTURERS OF

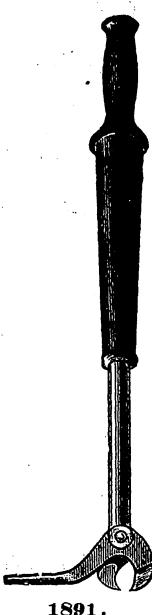
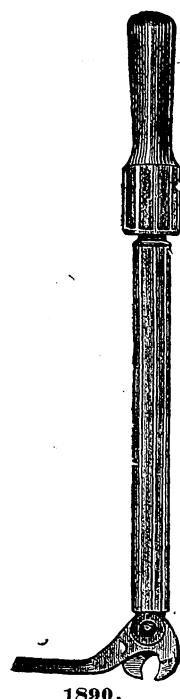
NAIL PULLERS.

TWO PATTERNS.

1890—NICKEL PLATED, SPRING IN JAW.

1891—GIANT PATTERN, " " " "

WARRANTED.



TOOL HANDLES.

No. 21, COCOBOLA HANDLE, TEN TOOLS.

No. 2, LARGE, " EIGHT "

STANDARD SCREW DRIVERS,

Round Forged Blades, Mahogany Handles.

GENERAL AGENTS,

JOHN H. GRAHAM & CO., { 113 Chambers St.,
N. Y. CITY, N. Y.

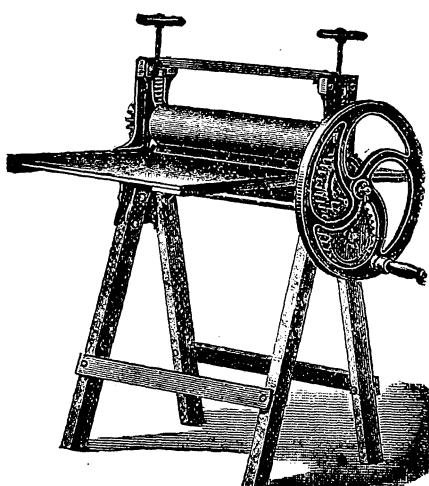
WRITE FOR PRICES.

The Family Mangle.

WARRANTED TO DO
Better Work than Hand-Work.

SAVES all the fuel.
two-thirds the work.
Keeps the linen whiter.

We Guarantee Every Machine.



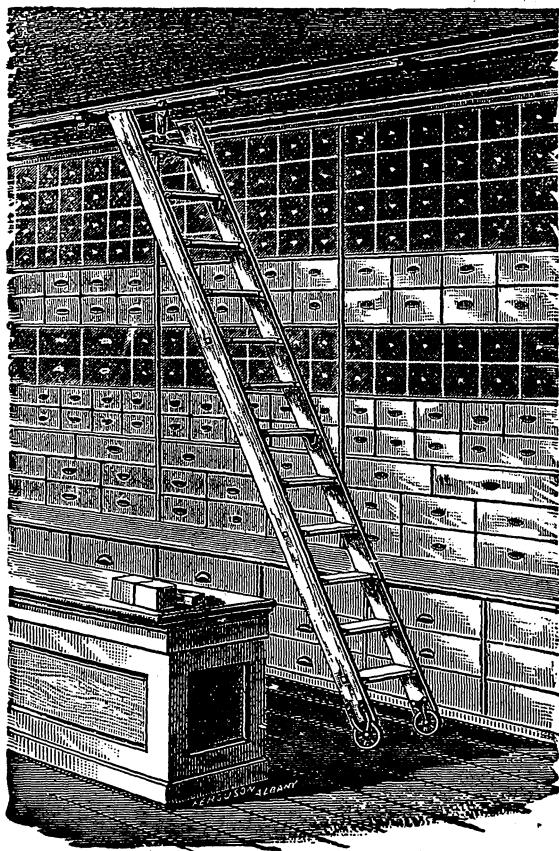
Send for descriptive circular to

S. C. Johnson, Racine, Wis.
Agents Wanted.

Vagaries of Sanitary Science. By F. L. DIBBLE, M.D. The author claims that the whole sanitary movement thus far has no resemblance to scientific investigation. Much sanitary nonsense has been foisted on the people. He submits investigations on air, water, soil, sewer gas, cemeteries, public funerals, meat, milk, filth and fecal diseases, typhoid fever, yellow fever, cholera, diphtheria, epidemics, boards of health and vital statistics. His purpose is to show the true nature of diseases and the means of avoiding them scientifically. 1893. 462 pages, cloth.....\$2.00

For Sale by DAVID WILLIAMS, 96 102 Reade St., N.Y.

THE "NOISELESS" STORE LADDER.

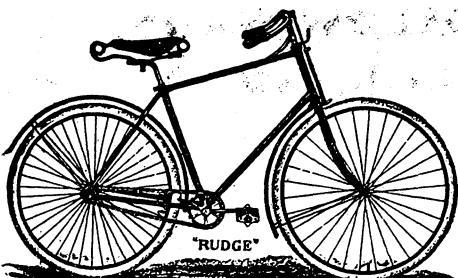


The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

M. CROISSANT,

ALBANY, N. Y.



HARDWARE DEALERS AND RUDGE CYCLES.

Agents wanted immediately for unoccupied territory. Write for illustrated catalogue and Price-list of 1894 Wheels.

The Bronson Supply Co.,

Sole Agents for the United States.

72 Beekman St., New York.



Light your Streets and Driveways.

The S. G. & L. CO.

Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.
Equal to the best Gas Light.
Will not Blow Out in the Strongest Wind.
Will not Smoke.
Will not Freeze.
Automatic Extinguisher.
Outside Wick Regulator.
Will Burn Four Hours for One Cent.

MANUFACTURED BY

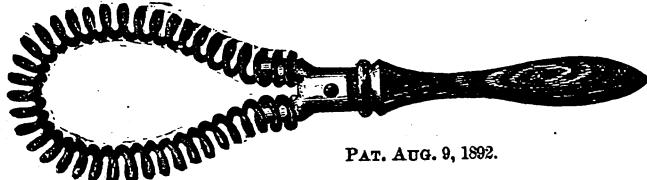
STEAM GAUGE AND LANTERN CO.,

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.

Globe Street Lamp.

THE BOSS DUST BEATER.



PAT. AUG. 9, 1892.

NEAT, DURABLE, AND DOES THE BUSINESS.

For removing dust and filth from Clothing, Upholstered Furniture, Rugs and Carpets it is just the thing. Will raise the nap and so improve the appearance. Will not, like other Dust Beaters, leave marks, nor tear the fabric. The coil is of steel wire secured in a malleable iron socket and attached to an enameled wooden handle. Just what everybody wants.

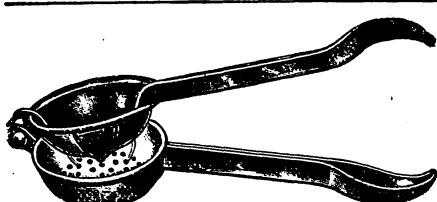
Sent by Mail, 35 Cents.

PEABODY & PARKS,

Manufacturers,

TROY, N. Y.

Do you make Lemonade?



If so you want our Squeezer. Positively the best. Suitable for any size Lemon. Write for catalogue and prices.

BERGER BROS., 237 Arch St., Philadelphia, Pa.

COLBY WRINGER CO., - Montpelier, Vt.

MANUFACTURERS OF THE

Premium Wringer,

With Automatic Apron Adjustment.

SURPLESS, DUNN & ALDER, Direct Representatives,
87 Chambers Street, New York.

We are Sole Manufacturers of the
Celebrated Erie and King Wringers.

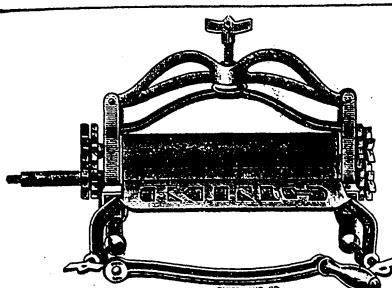
We also make all other brands of Wood and Iron
Frame Wringers.

Exclusive sale of the **ERIE** and **KING** Wringers
given to one dealer in each town.

Write for Catalogue.

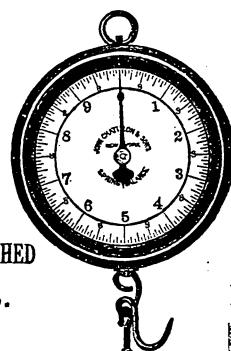
**THE NATIONAL WRINGER CO., CANTON,
OHIO.**

New York Office, 107 Chambers St., John T. Ryan, Mgr.



John Chatillon & Sons,

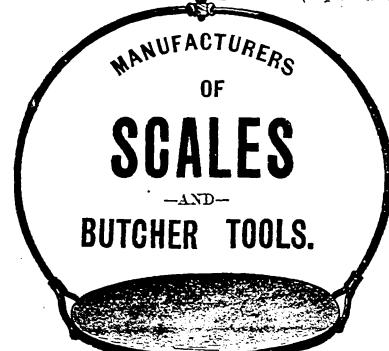
85, 87, 89, 91, 93 CLIFF ST., NEW YORK.



ESTABLISHED

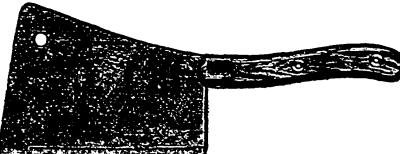
1835.

SEND FOR
PRICE-LIST.



Sole Agents for

Foster Bros.' Butchers' Cutlery.



John Chatillon & Sons, N. Y.

COMMON MOUSE TRAPS
BEST FOR USE!

Ripley Mfg. Co., Unionville, Conn.

Porcelain-Lined Lemon Squeezers, Steak Hammers, Boot Jacks, Magnetic Tack Hammers, Mallets, Bung-Starts, Hand Screws, Beacon Hill Pat. Mouse Traps, Sunny-Side 2 lb. Lap Board.

THOMAS CLARKE

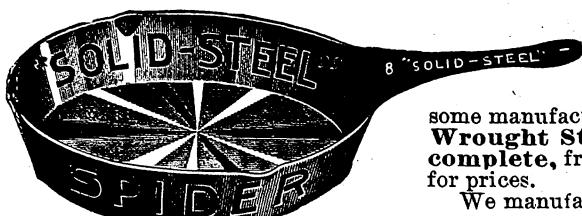
HARDWARE AND GENERAL AGENT.

(FIRST-CLASS REFERENCES.)

60 PRINCE WILLIAM ST., ST. JOHN,
NEW BRUNSWICK.

"SOLID-STEEL" SEAMLESS HOLLOW WARE.

Brilliant Finish.



No Seams, no Rivets in "Solid-Steel" Ware.

Notwithstanding the claims made by some manufacturers' agents our spiders are made from **Wrought Steel, Without Seams or Rivets.** complete, from a single piece of metal. Write for prices.

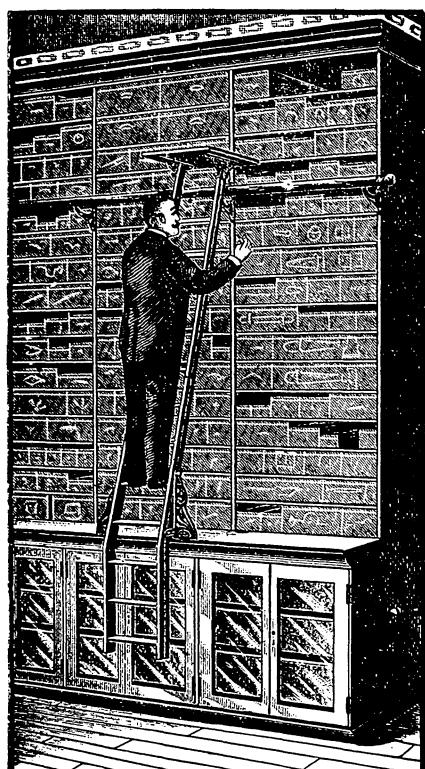
We manufacture our own goods.



"Solid-Steel" Mason Kettle.

The Cleveland Stamping & Tool Co., Cleveland, O.

We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.

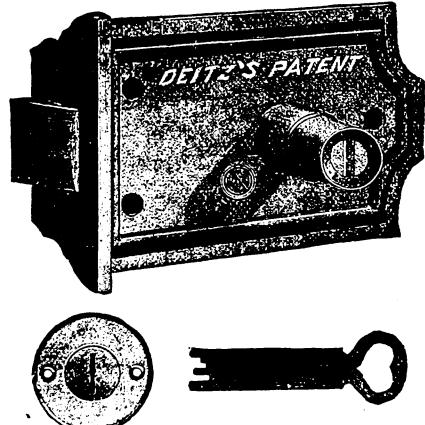


THE BICYCLE STEP LADDER.

Highest Award, Columbian Exposition. The Newest, Neatest, Simplest, Easiest Operated and Safest Step Ladder made. Ladders are not suspended, but supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very handsome. Made in different grades and prices to suit. Send for illustrated catalogue and prices. See this space next week for other styles.

The Bicycle Step Ladder Co., 50 State Street, Chicago, Ills.

A. E. DEITZ



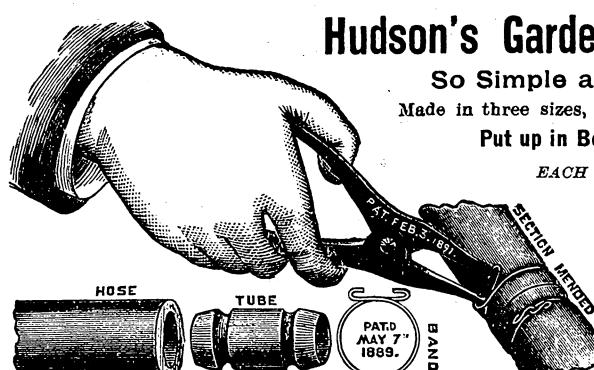
No. 109 Latch.

J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts., New York

Factory, BROOKLYN, E. D., N. Y.

Notwithstanding the claims made by some manufacturers' agents our spiders are made from **Wrought Steel, Without Seams or Rivets.** complete, from a single piece of metal. Write for prices.

We manufacture our own goods.



Hudson's Garden Hose Mender.

So Simple a Child Can Use It.

Made in three sizes, for $\frac{1}{2}$ in., $\frac{3}{4}$ in. and 1 in. hose.

Put up in Boxes for Family use.

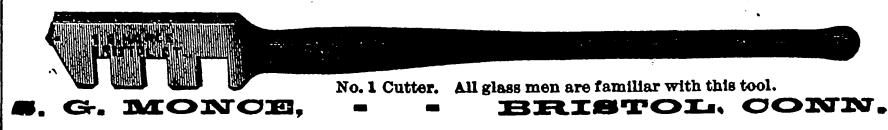
EACH BOX CONTAINS:

1 Pair Pliers,
20 Bands,
6 Tubes.

Sells readily at 75 cents.
Liberal discount to Dealers.
Send for Full Description.

C. E. HUDSON & CO., Manufacturers, Leominster, Mass.

MONCE'S NOVELTY GLASS CUTTERS.—INTERCHANGEABLE LOCK STENCILS



JONES' PATENT HOSE MENDER.

Best and Cheapest.

Does not obstruct flow of water. No tools or bands required.

$\frac{1}{2}$ in 40c., $\frac{3}{4}$ in. 50c., 1 in. 85c. $\frac{3}{4}$ doz. Liberal Discount to Dealers.

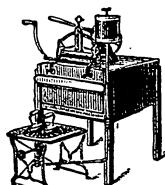


M. D. JONES & CO., 368 Washington St., Boston.

WASHING DAY.

The saddest of all the year,
It brings no rest, it brings no cheer.

But the "Columbian" (Self-Heating) Washer and Stove Combined makes "Washing Day" as good as the others of the week. Does away with all lifting, and being around a hot stove. Washes and boils the clothes at the same time. A wonderful seller.



SEND FOR A SAMPLE.
BENBOW MFG. CO., - St. Louis, Mo.



PHILLIPS SCREENS
Are Reliable.

THE SCHULTZE LOCK UNPICKABLE.



SEND FOR CIRCULAR.

MANUFACTURED ONLY BY

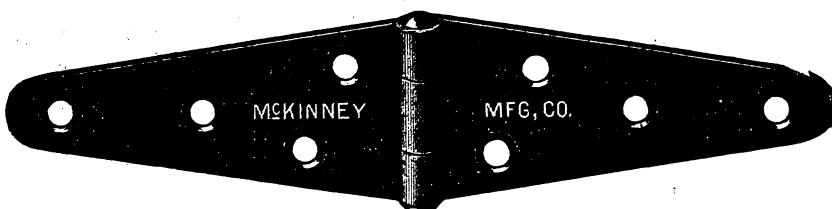
The Schultze Mfg. Co.
Cor. Emerald & Wishart Sts., Phila., Pa.

STEEL HINGES AND BUTTS.

—STANDARD GOODS.—

McKINNEY MFG. CO. - ALLEGHENY, PENN.

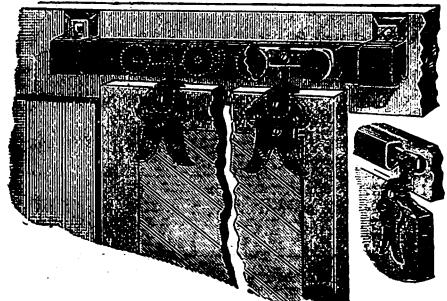
SEND FOR
LIST.



ORDERS FILLED
ON SIGHT.

"NONE BETTER."

BARN, MILL AND FIRE DOOR HANGERS HIGHEST AWARD



at WORLD'S FAIR, 1893,

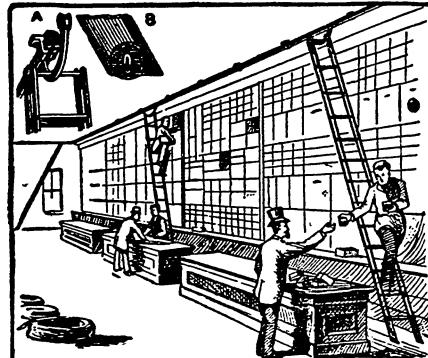
—ON—

Parlor, Barn and Fire Door
Hangers.

SEND FOR CATALOGUE.

COBURN TROLLEY TRACK MFG. CO.
HOLYOKE, MASS.

We make four styles of ROLLING LADDERS to
reach shelving of any height.



Barn Door with Lateral Adjustable Hanger. Very sim-
ple and cheap to apply.

ALUMINUM

Cooking Utensils, Tea and Coffee Pots, Chafing Dishes,
Rice Boilers, Percolators, Tableware. The metal in all
forms, Ingots, Sheets, Rods, Wire, Tubes, Castings.

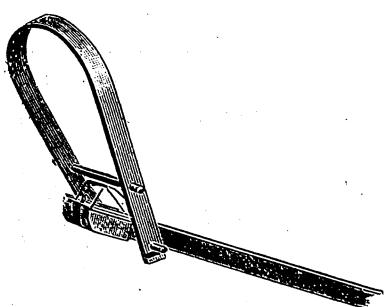


WRITE FOR CATALOGUE.

THE WOHLER ALUMINUM CO., 55 Jackson St., Chicago, Ill.

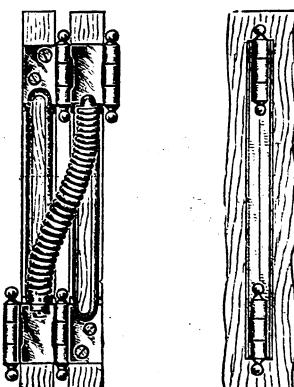
Improved American.

PATENT PENDING.



THE BISHOP POKEs are the best, as they are made from good material, are very strong, and have all the latest improvements up to date. Shun other pokes said to be just as good, for they are not. For names of Bishop Pokes we refer to price-list in *Iron Age*. They are for sale by nearly every jobber of hardware in the U. S.

A. W. BISHOP,
MAKER,
BEREA. - - . OHIO.



Highest Award, World's
Columbian Exposition,

—ON—

SPRING BUTTS.

For Catalogue and Prices Address

CHICAGO SPRING BUTT CO.
CHICAGO, ILL.

Or 97 Chambers Street, N. Y.

READING HARDWARE COMPANY.

..... Our "Duplex"
Wrought Butts have no
equal for strength and
beauty of Finish.

Made in Wrought Steel
and Bronze—all sizes.

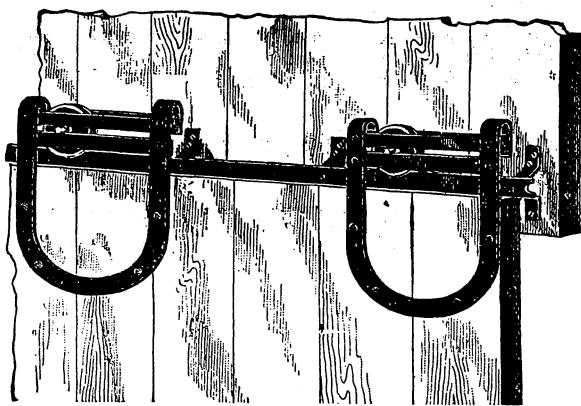
NEW YORK, PHILA., CHICAGO.
Factories, READING, PA.

Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL

MADE, FROM GOOD MATERIALS BY

A. J. Phillips & Co., Fenton, Mich.



Lane's Patent Steel Barn Door Hangers, "O. N. T." Track for same.

The first Anti-friction Steel Door Hanger placed upon the market and to-day stands as the original and best. Sold in all the States of the Union, as well as abroad. Also Lane's Noiseless Steel Parlor Door Hanger, using Single Steel Track, a great success.

Lane's Pat. Self-measuring Faucet, measuring liquids as drawn.
Swift's Coffee Mills in great variety.

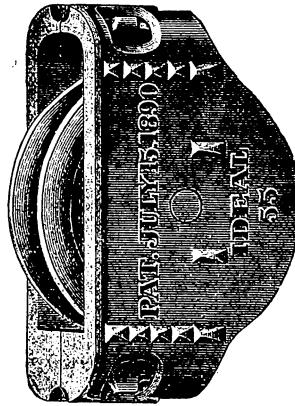
Manufactured by **LANE BROS.**, Poughkeepsie, N. Y.
JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., NEW YORK.

E. C. STEARNS & CO.,
SYRACUSE, N. Y.



EXCLUSIVE SELLING AGENTS
OF THE VANDERBILT
SASH BALANCE.

Ideal Sash Pulley, No. 55.

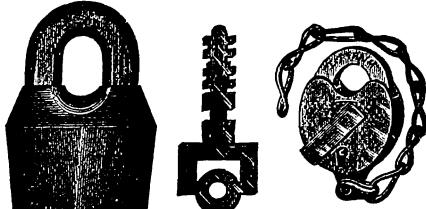


Adapted for auger socket or machine made mortise. Applied without chisel or screws, quickly and a perfect fit in every case. The only all round Sash Pulley made. Sample free. Price on application.

STOVER MFG. CO.,
145 River St., Freeport, Ill.

ESTABLISHED 1879.

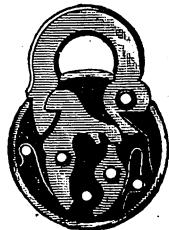
KEYSTONE LOCK WORKS,
E. T. FRAIM, Lancaster, Pa., U. S. A.



Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 181 different kinds. Write for our new 100-page catalogue.

SURPLESS, DUNN & ALDER, General Agents,
97 Chambers St., NEW YORK.

PATENT PERFECTION PADLOCK.



Eight Tumblers, Key Turning Both Ways.

Sizes, $\frac{3}{4}$ inch to $2\frac{1}{4}$ inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{2}$ and $\frac{3}{4}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.

Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price-Lists and Circulars.

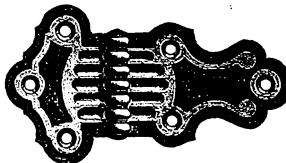
DOES IT PAY?

To buy an inferior article, which your trade condemns, when you can get

THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the **LEADER** for five years. Write to

CALDWELL MFG. CO., Rochester, N. Y.



CORRUGATED WROUGHT BRASS HINGES,

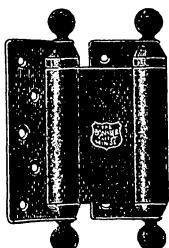
FOR REFRIGERATORS, ETC.

Original and Striking Designs in a Great Variety of Finishes.

SEND FOR PRICE-LIST.

THE STANLEY WORKS,

NEW BRITAIN, CONN.,
79 CHAMBERS STREET, N.Y.



THE BOMMER PATENT COMPOUND SPIRAL SPRING HINGES

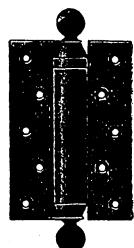
Are Made of

WROUGHT STEEL,

BRONZE AND BRASS.

Also of cast metal in all the finishes known to the trade.

BOMMER BROTHERS,
351 and 353 Jay Street, - - BROOKLYN, N. Y.



ELEMENTS OF COST.

By Frederick W. Child.

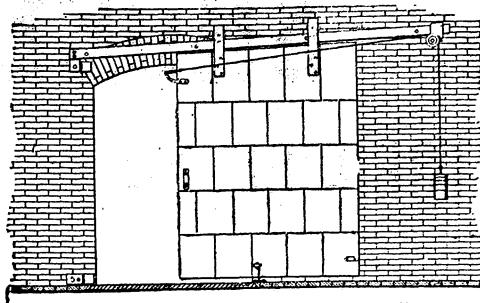
20 PAGES, $5 \times 7\frac{1}{4}$ inches.

Paper, 25 Cents.

An address to the Institute of Accounts, New York, of which the writer is a member, put in form to assist those in charge of manufacturing accounts. Practical forms are included for a series of order books, examples of foreman's order, form of pay-roll, quarter-time book, job time book, form of summary, charges book, summary of costs, material, labor, cash, expense, manufacturing and improvement acts, store-room, iron foundry, brass foundry. Sent post-paid on receipt of price, by

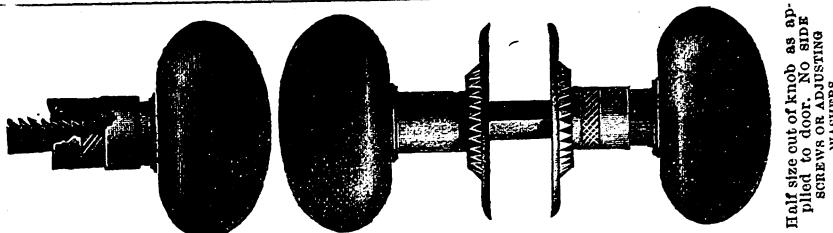
DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.

Improved Balanced Fire Door.



Victor Manufacturing Co., Newburyport, Mass.

Sectional cut showing construction of knob.



Don't you want your stock to represent the latest and most improved up to date Hardware? The Whipple Patent Door Knob is the latest and best Door Knob attachment ever made. Give it a trial. **PERRY & WHIPPLE CO., New Haven, Conn.** New York Sales Agent, E. G. SHEPARD, 142 Chambers Street.

SASH WEIGHTS!

NORTON BROTHERS,

Manufacturers,

Office: 813 Masonic Temple, CHICAGO.

WORKS AT MAYWOOD, ILL.

RICHARD ECCLES,

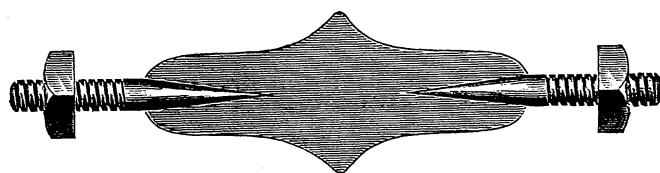
AUBURN, N. Y.,

MANUFACTURER OF

CARRIAGE FORGINGS,

Couplings, Clips, King Bolts, Fifth Wheels, &c.

SEND FOR SUPPLEMENT TO CATALOGUE,



Showing a full line of Axle Clips, Spring Bar Clips and Three Piece Saddle Clips.

SEND FOR CATALOGUE AND SUPPLEMENT.

WHY USE WOODEN OR HEAVY STEEL BLOCKS

WHEN THE STEEL AND IRON

TACKLE BLOCKS

MADE BY

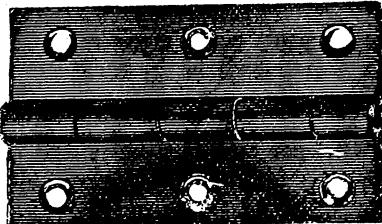
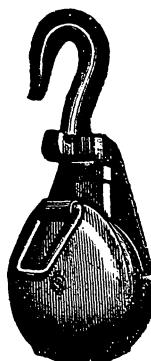
The Cleveland Block Co.,

CLEVELAND, OHIO, U. S. A.,

ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

General Agents: Topping Brothers, 92 Chambers Street, New York.
New England Agents: Dodge, Haley & Co., 212 High Street, Boston.



Gast Brass Butt Hinges

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,

MANUFACTURERS OF

BRASS, GALVANIZED & SHIP CHANDLERY HARDWARE.

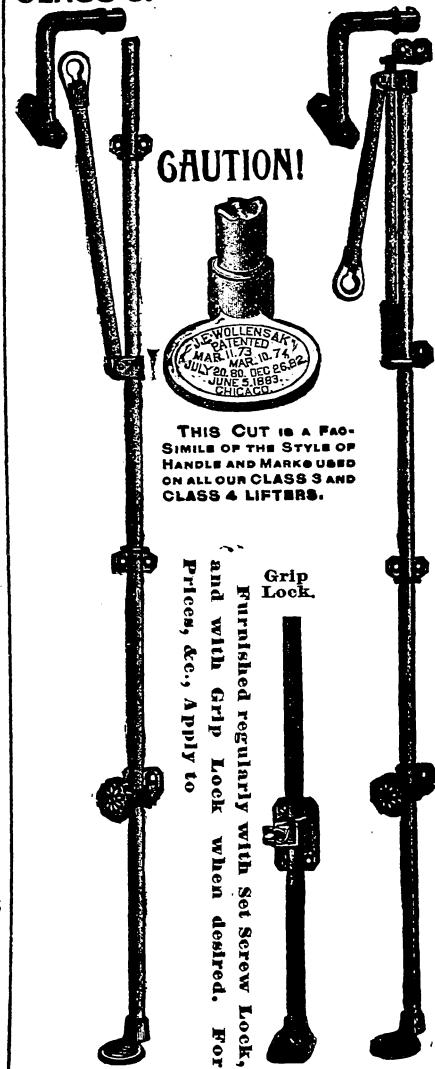
Transom...Lifters

OLD RELIABLE

J. F. WOLLENSAK'S PATENT.

CLASS 3.

CLASS 4.



THIS CUT IS A FAO-SIMILE OF THE STYLE OF HANDLE AND MARK USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.



J. F. WOLLENSAK, CHICAGO, ILL.

THE WILCOX & HOWE COMPANY,
BIRMINGHAM, CONN.,

MANUFACTURERS OF

A Full Line of Carriage Hardware
ALSO SPECIAL FORGINGS.

Estimates cheerfully given. Send for Catalogue

SASH WEIGHTS

E. E. BROWN & CO.,

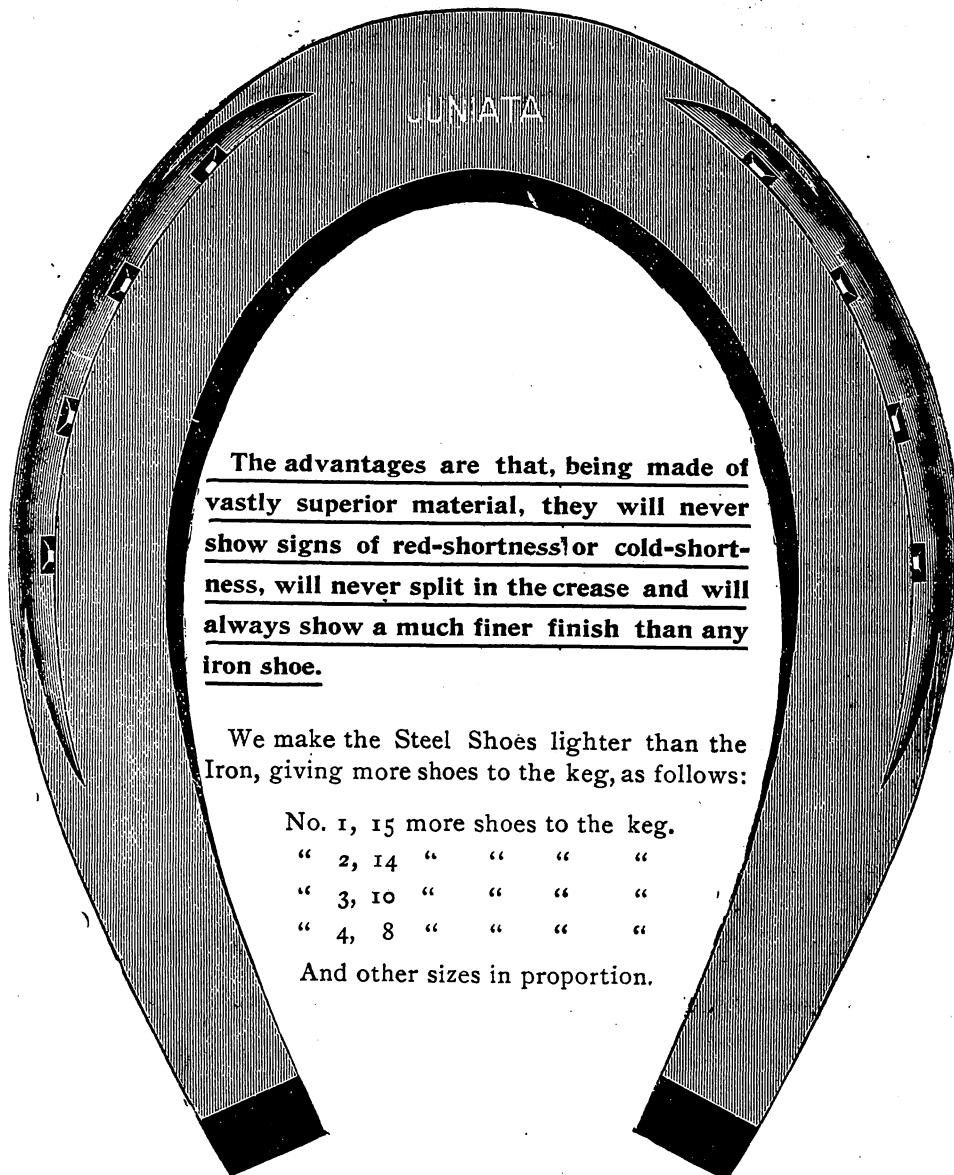
McKean and Meadow Sts.,

PHILADELPHIA, PA.

STEEL HORSE SHOES.

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

No. 2 EXTRA SWAGED FRONT.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25-pound boxes.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

SHOENBERGER & CO.,

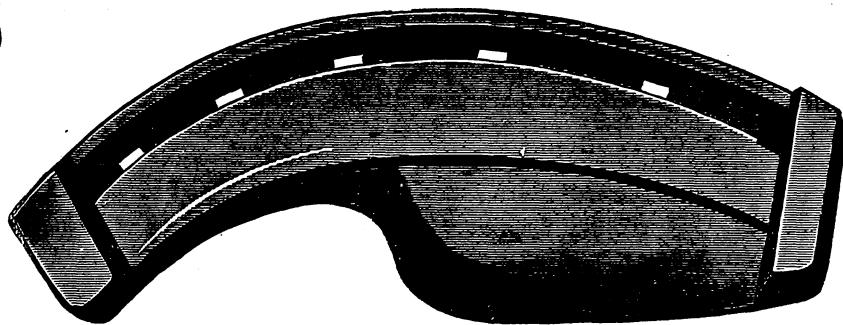
JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

SCRANTON FORGING CO.,
SCRANTON, PA
CARRIAGE HARDWARE AND
SPECIAL DROP FORGINGS.

FORGED

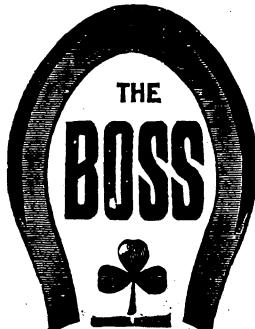
OX

SHOES.



Made under Deeble's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.
IT IS JUST RIGHT.



HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,

CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,

MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES — X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.
Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.
F. W. CARPENTER, Pres. C. H. PERKINS, Gen. Manager, R. W. COMSTOCK, Secy.
J. C. McCARTY & CO., Agents — CHARLES R. STARK, Treas.

J. C. McCARTY & CO., Agents — 97 Chambers Street, New York.

**THE NEW DIAMOND STATE HORSE AND
MULE SHOES.**

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

DIAMOND STATE IRON CO.
WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blank Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.
PHILADELPHIA OFFICE, 206 So. Fourth St. Correspondence invited. NEW YORK OFFICE, 11 Pine St.



Elegant Iron.

Beautiful Shape.

HORSE SHOES,

Light, Medium and Heavy.

MULE SHOES,

Light, Medium and Heavy.

Illustrated booklet and prices to all parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,
ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A.

**BURDEN'S
HORSE SHOES.**

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Co.

TROY, N. Y.

**PHOENIX
HORSE SHOES.**

PHOENIX HORSE SHOE CO.,

ROLLING MILLS AND FACTORIES.

Poughkeepsie, N. Y.
Joliet, Ill.

NEW YORK OFFICE, No. 66 Reade St.

Standard Horse Shoe Co.,
Manufacturers of
HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

4 Liberty Square, Boston, Mass.

"The Best Driving Nail."

HIGHEST AWARD
—AT—
World's Columbian Exposition.

In the tests submitted before the judges on awards the Capewell No. 6 was shown to be 17 per cent. tougher than No. 8 of other makes.

CAPEWELL HORSE NAILS,
MADE BY
THE CAPEWELL HORSE NAIL CO., - - - HARTFORD, CONN.

Office of D. G. BURNHAM,
Director of Works, World's Columbian Exposition,
JACKSON PARK, CHICAGO, ILL.

October 28, 1893.

To THE CAPEWELL HORSE NAIL Co.:
Gentlemen—I have used your horse nails here on the horses belonging to the World's Columbian Exposition, and I think they are far superior to any others that I have ever used. As I have been in the horseshoeing business for about twenty-five years, I know what I am talking about.
Very respectfully,
HERMAN J. HENKE,
Foreman Blacksmith, World's Columbian Exposition.

The Capewell Patent Corrugated Horse Nail.

Needs No Clinching.

Highest Award

FOR
Supreme Excellence

TO
The PUTNAM Hot-Forged and

Hammer-Pointed Horse NAILS,



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded:
"Supreme excellence in material, method in manufacture, and quality of finished product; elasticity and smoothness combined with holding power in clinch."

There is nothing beyond "supreme excellence," nor is there anything comprised in a horse nail, except the "material from which it is made," "the method of manufacture," and "quality of finished product." Putnam nails, by their "elasticity," give slightly to the expansion and contraction of the hoof while the horse is in motion; by their "smoothness," do not enlarge the nail holes in the hoof, while their "supreme excellence," in "holding power in the clinch," enables them to hold the shoe in the hardest service until worn out.

By the "use of small nails," large holes are avoided and money saved to the smith. Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what qualities go to make up a good horse nail and that only the "Putnam" contains them all.

PUTNAM NAIL CO.,
Neponset, Boston, Mass.

H. D. SMITH & CO..

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of



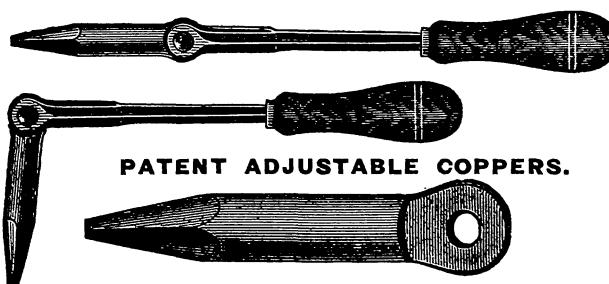
Manufactured by the NATIONAL HORSE NAIL CO.,
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents, New York.

COVERT PAT. ADJUSTABLE SOLDERING IRONS AND COPPERS

It is a complete tool in every respect, and can be as easily adjusted at angle while hot as cold. The handle can be used indefinitely, as when the copper is worn out it can be replaced in the same handle, making the iron as good as new at about half the cost of the ordinary soldering iron.



A sample of $\frac{1}{2}$ in. soldering iron will be sent by mail, free of postage to any address, on receipt of sixty cents (60c.).

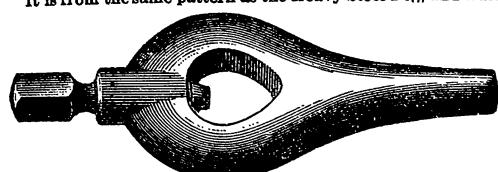
FOR SALE BY ALL GENERAL HARDWARE AND PLUMBERS' SUPPLY HOUSES.

COVERT MFG. CO. - West Troy, N. Y.

LE COUNT'S STRAIGHT TAIL DOG,

WITH STEEL SCREWS.

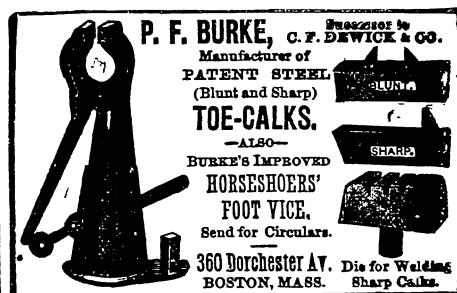
U. S. Standard, and the points hardened. To be driven from a stud in the face plate. It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

C. W. LE COUNT, MANUFACTURER, 50, NORWALK, CONN., U. S. A.
These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.



Crescent
Horse and Mule Shoes,
BAR IRON.

CRESCENT HORSE SHOE AND
IRON CO.

Max Meadows, Va.



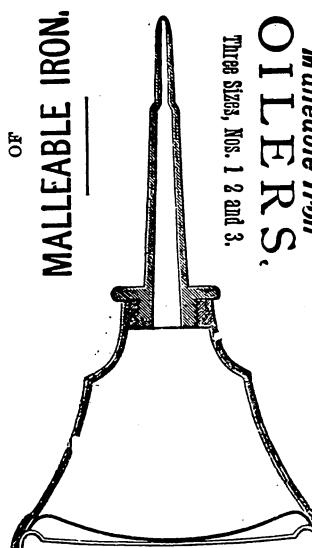
P. J. CONROY & CO.,
Paschal, PHILADELPHIA.



Have rapidly supplanted all others.
Refrigerator Trimmings.

BUFFALO SCALE CO., Buffalo, N.Y., SCALES OF ALL KINDS.

Patented Articles
OR
MALEABLE IRON.



New Improved
PATENT
Malleable Iron
O I L E R S.
THREE SIZES, NOS. 1 2 and 3.

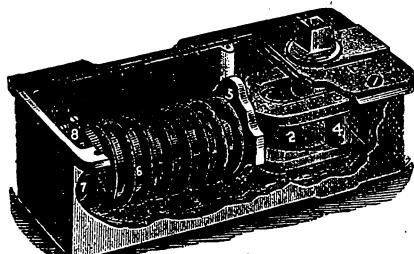
Hammer's Adjustable Clamps.
Mall. Iron Hand Lamps.
M. I. Hanging Lampc.

New Pattern Heavy Screw Clamps.
Strongest in the market.

For Sale by all the Principal Hardware Dealers.
SEND FOR PRICE LIST.

MALEABLE IRON CASTINGS
of superior quality, and Hardware Specialties
in Maleable Iron, made to order.

HAMMER & CO., Branford, Conn.



CHECKING SPRING HINGES

For Double or Single Acting Doors.

Applied in floor under door. They close the door gently, without noise or violence, and stop it at once at the center. Doors cannot sag, springs do not break or set. Send for new price-list.

J. BARDSLEY,
149 & 151 Baxter St., New York.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for
Sash Cords, very strong and lasting (some in
daily use ten years), and gives thorough satis-
faction wherever used. The patented attach-
ments are very simple and can be applied to
any window.

MANUFACTURED ONLY BY

"THOMAS MORTON,"
65 Elizabeth Street,
Write for Prices. NEW YORK.

The Practical Polish and Varnish Maker.
By H. C. STANDAGE. A treatise containing 750 re-
cipes and formulae for the manufacture of var-
nishes, polishes, &c. 12mo, cloth \$2.50

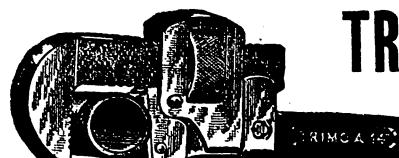
For Sale by DAVID WILLIAMS, 98-102 Reade St., N.Y.



Improved Adjustable S-Wrench.
Case-Hardened Throughout. Parts Interchangeable.

For Circulars and Price-List, address

BEMIS & CALL HARDWARE & TOOL CO.,
SPRINGFIELD, MASS., U. S. A.



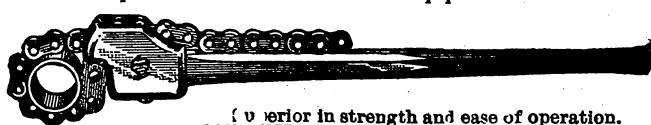
TRIMO PIPE WRENCH,

Forged Steel.

All parts Interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no trouble in close quarters. Does not crush the pipe.

**TRIMO
CHAIN
PIPE
WRENCH.**



Superior in strength and ease of operation.
COMPLETE circular grip. Never slips nor crushes.

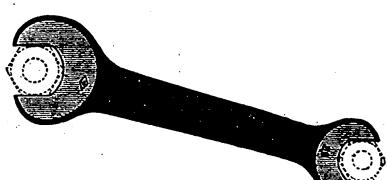
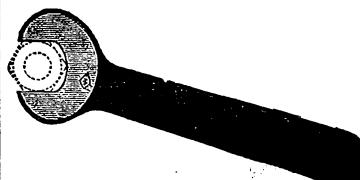
Can be used with one hand and in closer quarters than any other Basin Wrench. Parts Interchangeable.

**TRIMO
BASIN WRENCH.**

**TRIMONT MFG. CO., ROXBURY
MASS.**

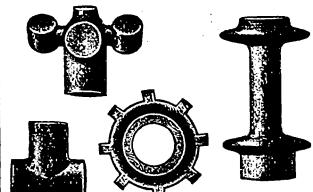
SINGLE AND DOUBLE HEAD WRENCHES.

Furnished Finished or Unfinished. Drop-Forged from Steel.



The finished Wrenches are milled to fit U. S. Standard finished Nuts and are polished and case hardened. In stock for all sizes bolts from $\frac{1}{8}$ inch to $2\frac{1}{4}$ inches inclusive.

J. H. WILLIAMS & CO., 9-15 RICHARDS ST., BROOKLYN, N.Y.
Iron, Steel, Copper and Bronze Drop-Forgings



WYMAN & GORDON WORCESTER, MASS. DROP FORGINGS

C AND MACHINISTS' CLAMPS

Drop Forged from Bar Steel.

C Clamps, in 5 Sizes,

with Openings

$1\frac{1}{4}$, $2\frac{1}{4}$, $3\frac{1}{4}$, $4\frac{1}{2}$, $6\frac{1}{2}$ inches.

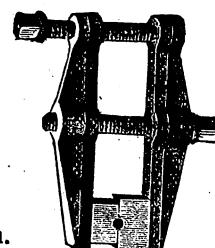
Machinists' Clamps, in 4 Sizes,

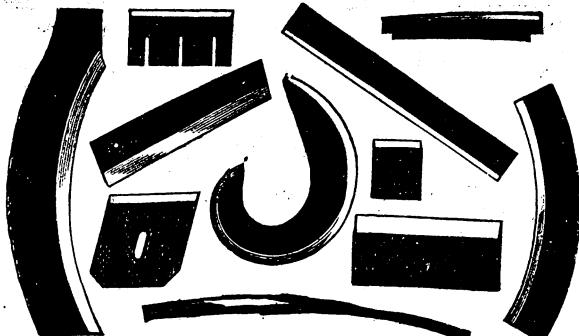
with Openings

$1\frac{1}{4}$, $2\frac{1}{4}$, $3\frac{1}{4}$, $4\frac{1}{4}$ inches.

Drop Forgings of every description.

THE BILLINGS & SPENCER CO., Hartford, Conn.





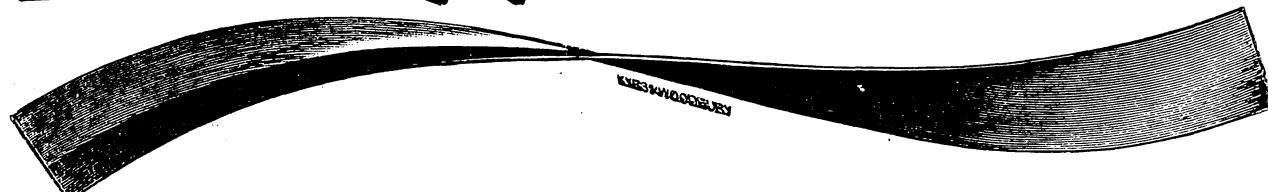
LORING COES & CO.

WORCESTER, MASS.

Manufacturers of **MACHINE KNIVES.**

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades Etc., showing how the Steel is laid.

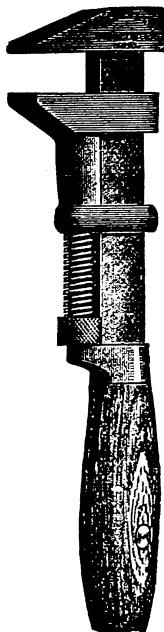


L. COES'

Genuine Improved
KNIFE HANDLE
PATENT

**Screw
Wrenches**

MANUFACTURED BY
COES WRENCH CO.,
WORCESTER, MASS.



Established in

1839.

Registered

March 31, 1874.

Patented July

6, 1880.

Patented July

8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

STRAIGHT BAR, EXTRA LONG NUT FOR SCREW IN JAW.

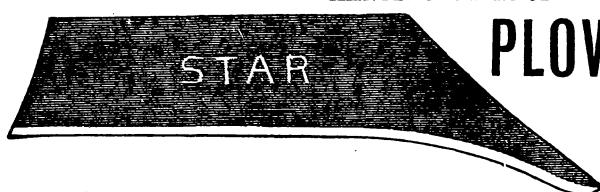
The BEST MADE and STRONGEST WRENCH in the MARKET.

J. C. McCARTY & CO., { New York Agents.
JOHN H. GRAHAM & CO., }

STAR MANUFACTURING CO..

Carpentersville, Kane Co., Ill.

MANUFACTURERS OF



PLOW SHARES.

Plow Moldboards,
Landside Plates,
Landside Points.

Lister Shares, Fin Cutters, Cultivator Shovels, Cultivator Shovel Points, Plow Points, Screw Coulter Hubs.

Mention IRON AGE.

THE TOPLIFF & ELY CO.,

MAKERS.



ELYRIA, OHIO.

Every Pair Warranted.
Liberal Discount to
Trade.

COLDWELL

LAWN MOWER CO.,

Newburgh, N. Y.



THE BEST MOWER MADE.

The Lightest Running Mower in the World.

This is the only Lawn Mower that stood the test of working the entire season on the Columbian Exposition Grounds without any repairs.

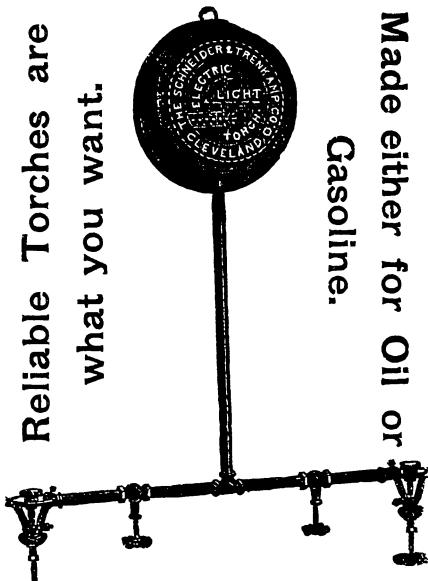
WHEEL BARROWS.

Wood, Iron, Steel,
for Ore, Coal, Furnaces,
Brickyards, Stoneyards, Farm
and Garden Use.

The

Kilbourne & Jacobs Mfg. Co.,
COLUMBUS, O., U. S. A.

Reliable Torches are
what you want.



These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

Write us for prices. A liberal discount given to the trade.
Manufactured by
THE SCHNEIDER & TRENKAMP CO.,
Nos. 478 to 497 Case Ave., Cleveland, Ohio.

Made either for Oil or
Gasoline.

McKINNON DASH & HDW. CO.,

LIMITED, Manufacturers of

FINE QUALITY

DASHES

AND

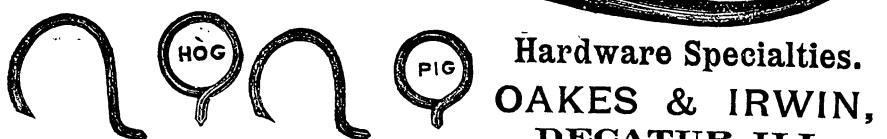
FENDERS,

SURREY DASH. BUFFALO. - N. Y.

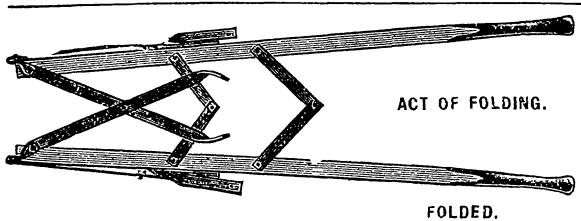
The "MAJOR" Hog Ring and Ringer.



Send for 1894
Catalogue and Prices.



Hardware Specialties.
OAKES & IRWIN,
DECATUR, ILL.



ACT OF FOLDING.

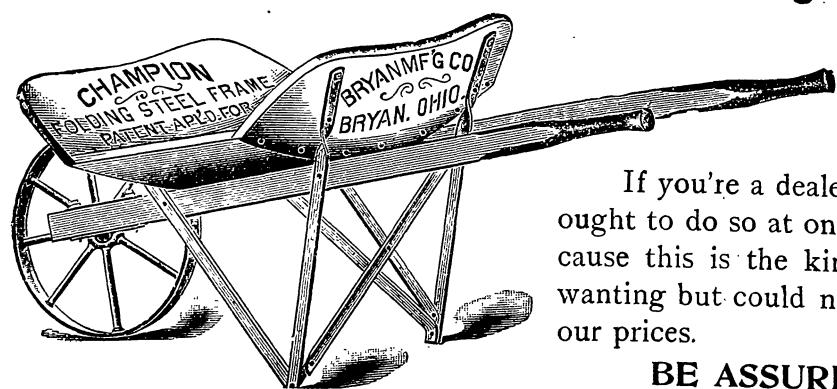
FOLDED.



Champion

Folding Steel Frame Barrow

Beats 'Em All.



If you're a dealer and haven't ordered a sample you ought to do so at once. It's money in your pocket, because this is the kind of barrow your customer's been wanting but could never get. Write us anyway and get our prices.

BE ASSURED IT WILL PAY YOU.

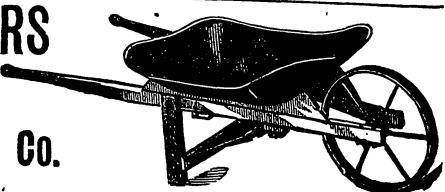
ALL STEEL

WHEELBARROWS & SCRAPERS

MANUFACTURED BY

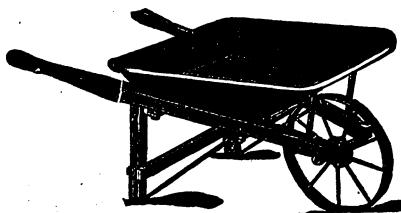
AMERICAN STEEL SCRAPER Co.
104 Court Street, SIDNEY, O.

Write
for
Catalogue



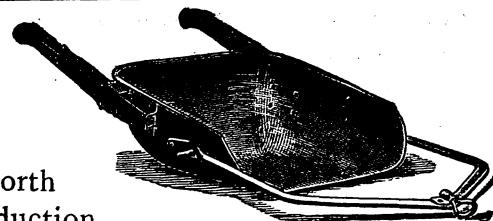
ONE MOMENT.

Have you bought your spring stock?

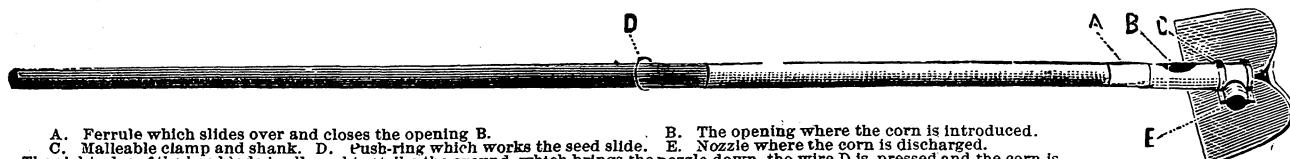


If not don't you think it worth while to investigate our production before doing so? We can and will make it interesting to you if you will write us.

Sidney Steel Scraper Co., 924 Poplar Street, SIDNEY, OHIO.



AYERS' COMBINED HAND PLANTER AND HOE.



A. Ferrule which slides over and closes the opening B.
C. Malleable clamp and shank. D. Push-ring which works the seed slide. E. Nozzle where the corn is discharged.
The right edge of the hoe blade is allowed to strike the ground, which brings the nozzle down, the wire D is pressed and the corn is dropped from the nozzle E, an instant only being required for the operation.

This is a convenience everywhere, besides being the only planter adapted for hard, rough and rocky ground requiring a hoe in covering and in such cases it enables the workman to accomplish twice the usual service. For replanting and first hoeing it is especially adapted, as it is both a hoe and planter as required. As a hoe it is cheap at 50 cts., which leaves only \$1.50 as the additional cost for the planter, which is nothing in comparison to the convenience of always having a planter in hand supplied with seed during the operation of hoeing. With beans and peas it is even more accurate than with corn. There is hardly a farmer in the country who would not find it an economy to have one of these planters, however many other planters he may have or however good they may be. Price \$2.00, \$15.00 per doz., \$7.50 per $\frac{1}{2}$ doz., cash with order. Shipments f. o. b., New York or Petersburg, Va., as desired. Correspondence solicited.

J. R. AYERS, Pattee and Manufacturer, PETERSBURG, VA.



LAWN SPRINKLERS.

We manufacture the BEST and CHEAPEST Lawn Sprinklers in the World.

The only Sprinklers which have no revolving parts to leak or wear out. The only Sprinklers free from small holes, and which cannot become clogged with gritty substances. The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe. The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with low pressures. We also manufacture the old style revolving sprinklers, but for our own use would not have them.

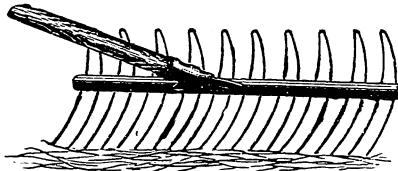


Ette & Henger Mfg. Co.

ST. LOUIS, MO.

SEND FOR DESCRIPTIVE CIRCULARS.

The Old Reliable!



DEALERS AND JOBBERS!

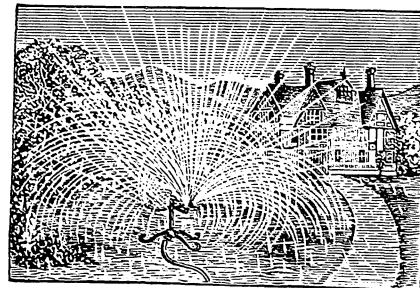
Do not be deceived by the CHEAP Sheet Metal imitations of our Rake. Take a sheet metal rake at each end and you can twist it ALL OUT OF SHAPE! They are WEAK! Don't be deceived into buying post-hole diggers that are flimsy imitations and offered as "just as good." Certain parties are copying nearly our whole line of goods, even to our style of ad., to deceive buyers. We have the ORIGINAL line of Diggers, Rakes, Curry-Comb, Pruning Shears, &c. Ask for KOHLER'S and get the GENUINE, ORIGINAL and BEST!

F. E. KOHLER & CO., Canton, Ohio.

GENUINE

"CALIFORNIA"

Lawn Sprinkler.



MANUFACTURED BY
BLAIR MANUFACTURING CO.
SPRINGFIELD, MASS.

Write for prices.

Also makers of the most complete line of
Lawn Mowers on the market.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.

The Synonym for Perfection in

Lawn Mowers is "PENNSYLVANIA."

Please Read following:—

HOW DO THEY WEAR?

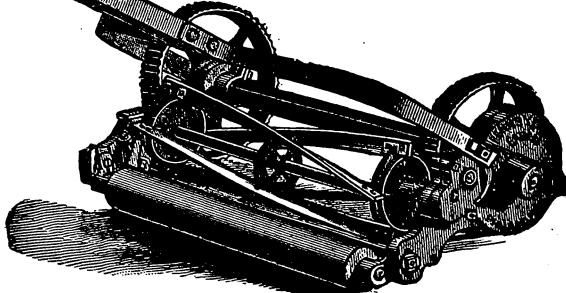
"A single straw shows which way the wind blows."

"I have used this Pennsylvania Machine nearly 15 years and only paid out 5 cents on it, and to-day does as good work as it ever did." (Signed),

L. OSBORN, Greenville, Mich.
Jan. 17, 1894.

Highest Award at World's Fair on our entire line of Lawn Mowers.
Largest manufacturers of Lawn Mowers in the known world—Continental, New Quaker City, Great American, New Departure, Horse and Two-man Lawn Mowers.

Most Popular Mower on the Market.



Supplee Hardware Co., PHILADELPHIA.

McGuire's ♦ Diamond.

MANUFACTURED BY
Dille & McGuire Mfg. Co.,
RICHMOND, IND., U. S. A.

PRICE-LIST.

Wheels, 8 Inches High. Cutter, 5½ Inches Diameter.

LENGTH.	LIST.	Discount to the Trade,
10 Inch	\$13.00	
12 "	14.00	
14 "	15.00	
16 "	16.00	70 per cent., F.O.B. Factory.
18 "	17.00	

PHOSPHOR BRONZE JOURNAL BEARINGS. BEST QUALITY STEEL.

This is the Mower contracted for by the Chief of Construction at the Columbian Exposition; was used on the lawns at the World's Fair grounds during the preparatory season of 1892, and being approved by the Landscape Architects, was adopted exclusively for 1893.

If you wish a first-class Mower in all respects, one that is fully warranted,

—BUY McGuIRE'S DIAMOND.—

**Chadborn & Coldwell
Mfg. Co.,**

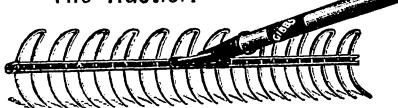
NEWBURGH, N. Y.,
Sole Manufacturers of

New Model
AND
Excelsior
LAWN
MOWERS
ALSO
The Rival,
The O K,
Etc., Etc.

Send for Illustrated Catalogue.



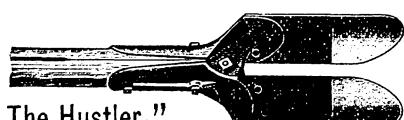
"The Hustler."



By buying the Hustler Lawn Rakes you have the cheapest and best made. All leading jobbers handle them.

GIBBS MFG. CO., Canton, Ohio.

Our line of Post Hole Diggers comprises 5 of the Best Known Styles on the market. Prices low.

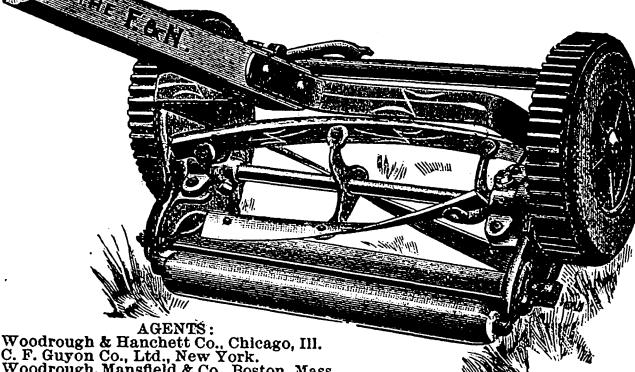


"The Hustler."

THE F. & N. MFG. CO.,

Manufacturers of
Lawn Mowers
and
Grass Catchers,
RICHMOND, IND., U. S. A.

**THE
F. & N.
LAWN
MOWER
"94."**

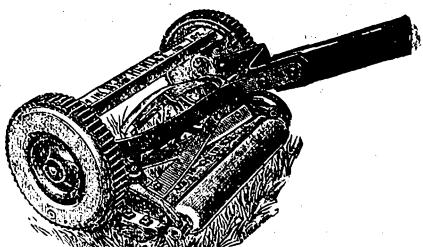


AGENTS:
Woodrough & Hanchett Co., Chicago, Ill.
C. F. Guyon Co., Ltd., New York.
Woodrough, Mansfield & Co., Boston, Mass.

HENLEY'S MOWERS

For Lawns and Parks

Are first class, high grade machines, made of the best materials, neat, symmetrical, strong and unexcelled in construction and ease of operation. Does perfect work. For prices, address



M. C. HENLEY, Sole Mfr., Richmond, Ind., U. S. A.

EASTERN REPRESENTATIVES: H. S. Earle, 110 and 112 N. Warren St., Syracuse, N. Y.; Wm. H. Cole & Sons, 13 S. Charles St., Baltimore, Md.; Carpenter & Bayles, 91 Chambers St., New York City.

**WROUGHT
WASHERS**

Made from specially rolled plate by our own patented machinery.
Every washer flat, with hole in true center. Sold in 200 lb. kegs, or 1 and 5 lb. paper boxes.
Get prices.

True to Gauge

THE MILTON MANUFACTURING CO., MILTON, PA.

HIGH GRADE

Machine Bolts

Hot pressed Nuts

Stamped to size. Guaranteed extra quality.
Send for catalogue.

Pennsylvania Bolt & Nut Co. Lebanon Pa.

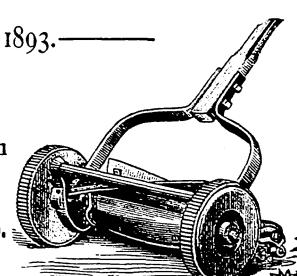
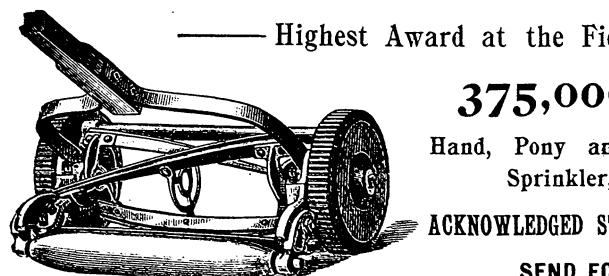
MANUFACTURERS OF

REFINED BAR-IRON · MACHINE-BOLTS · TRACK-BOLTS · & BOLT-ENDS ·
LAG-SCREWS · GIMLET-POINTED COACH-SCREWS · HOT PRESSED & COLD PUNCHED SQUARE & HEXAGON NUTS ·
CHAMFERED & TRIMMED NUTS · WROUGHT & CAST WASHERS · TURN-BUCKLES ·
STRUCTURAL & ELECTRICAL FORGINGS · BOILER & BRIDGE RIVETS · CAR FORGINGS & ARCH-BARS ·

Genuine Philadelphia Lawn Mowers.

Highest Award at the Field trial, World's Fair, Chicago, 1893.

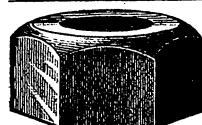
375,000 Machines Sold.



Hand, Pony and Horse Machines, Traveling Lawn Sprinkler, Lawn Sweeper and Collectors.
ACKNOWLEDGED STANDARD OF EXCELLENCE FOR 22 YEARS.

SEND FOR PRICE-LIST AND DISCOUNTS.

THE PHILADELPHIA LAWN MOWER CO., { Successors to Graham, Passmore & Co., { 3107 & 3109 Chestnut St., Philadelphia, Pa.



PORTCHESTER BOLT & NUT CO.

Port Chester, N. Y.

MANUFACTURERS OF

BOLTS, NUTS, RIVETS and WASHERS
CHAMFERED AND TRIMMED.

SQUARE AND HEXAGON NUTS A SPECIALTY.

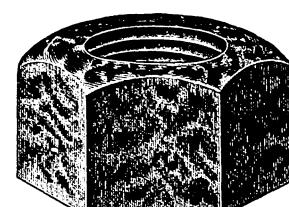


DUNHAM NUT CO.,

UNIONVILLE, CONN.

Manufacturers of

All Grades
of
Finished
Nuts
and



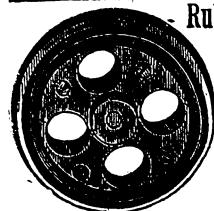
Automatic Cold Press Nut Machines.
SEND FOR CATALOGUE.

BOLTS,

Machine, Car,
Track, Pipe, Loom.
Cold Punched

NUTS.

AMERICAN BOLT COMPANY, - - Lowell, Mass.



Rubber and Iron Wheels

Casters for Trucks,
Baskets and Boxes

Heavy Casters for
Mill use.

Catalogues free.

G. P. CLARK, Box 0.

Windsor Locks, Conn.

EXPANSION BOLTS.



Manufacturers of Single and Double,
For fastening all kinds of Structure to Brick and Stone
Work. Catalogue furnished on application.

STEWARD & ROMAINE MFG. CO., - - Philadelphia.

K

INTERCHANGEABLE
LOCK-CORNER SHELF BOXES,
Screw Cases, &c.,
FOR THE HARDWARE TRADE.

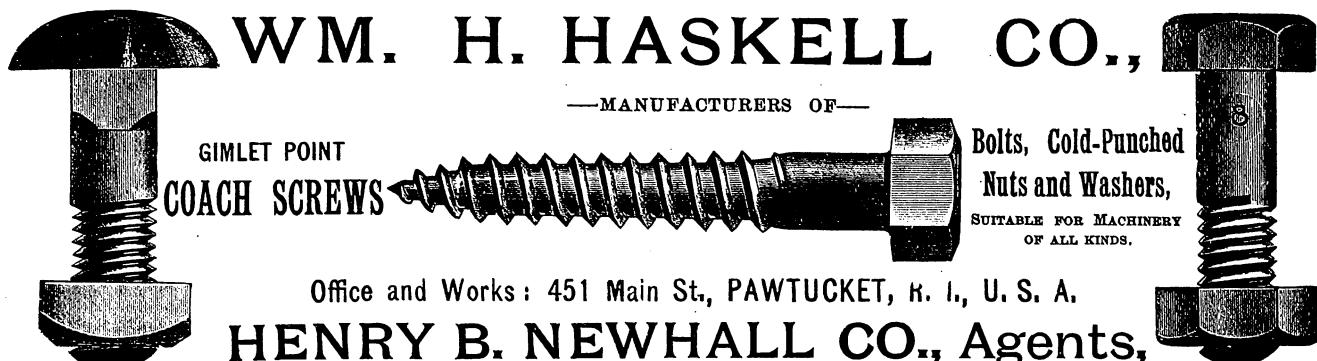
A. H. GREEN,
22 Park Place, New York.



WM. H. HASKELL, PRESIDENT.

E. S. MASON, TREASURER.

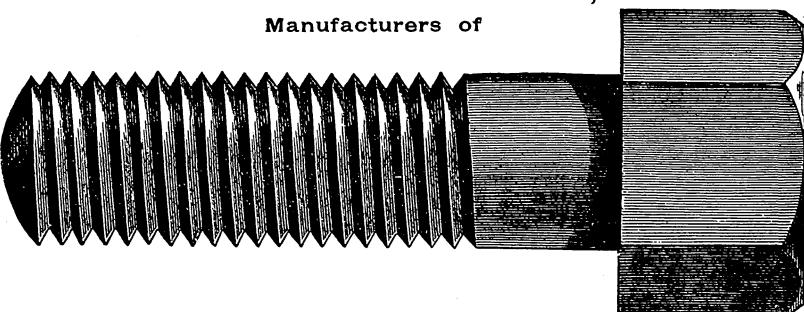
D. A. HUNT, AGENT.



WORCESTER MACHINE SCREW CO., Worcester, Mass.

SET,
CAP AND
MACHINE
SCREWS.

Manufacturers of

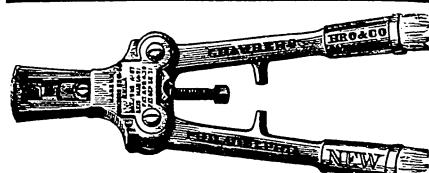


STUDS FOR
STEAM
ENGINE,
PUMPS, &c.

EXPANSION BOLTS.



For Fastening all Kinds of Structure to
Brick and Stone Work.
Patentee and M'fr, ISAAC CHURCH.
Toledo, O.
Send for Catalogue.



BOLT & RIVET CLIPPERS,
For cutting off the ends of Bolts and Rivets.
Liberal discounts to the trade.

CHAMBERS BROTHERS COMPANY
52d ST., BELOW LANCASTER AVE.,
PHILADELPHIA, PA.

WM. H. JACOBUS

No. 90 Chambers St., New York.

New York Office of

J. F. Wollensak.
Barnes Mfg. Co.
N. R. Streeter & Co.
Geo. W. Nock.
Tuck Mfg. Co.
Henis Vegetable Press.
Dille & McGuire Mfg. Co.
Bommer Bros.
Palmer Hdw. Mfg. Co.
Wire Goods Co.
National Rivet Works.
Wolcott Hdw. Co.
Fibre Head Mallet.
Burnside Cedar Faucets.
Cleveland Window Shade Co.
Zimmerman's Blind Adjusters.
Garritt & Beach.
Wilcox Mfg. Co.
M. B. Schenck & Co.
Hemacite Mfg. Co.
Franklin Mfg. Co.
Atlas Mfg. Co.
National Specialty Mfg. Co., Ltd.



J. FRED WILSON, Worcester, Mass.

Metal Punching & Die Work.

Cold Punched Nuts and Washers
for all Purposes.
SEND FOR PRICES ON

SPECIALTIES IN LINE OF PRESS WORK.

CLASSIFIED LIST OF ADVERTISERS.

Agricultural Implements.

Avers, J. R., Petersburg, Va.
Sickles, Sweet & Lyon, 35 Barclay St., N. Y.

Air Compressors.

Norwalk Iron Works, S. Norwalk.
Rand Drill Co., 23 Park Place, N. Y.

Air Moving Machinery.

Howard & Morse, 45 Fulton, N. Y.

Aluminum.

Illinois Pure Aluminum Co., Lemont, Ill.
Pittsburgh Reduction Co., Pittsburgh.
Scovill Mfg. Co., Waterbury, Conn.

Aluminum, Brass and Bronze.

Gaylor, F. L. Co., Ansonia, Conn.
Haight & Clark, Albany, N. Y.
Pratt & Cady Co., Hartford, Conn.
St. Louis Bronze & Aluminum Works, St. Louis, Mo.

Aluminum Solder.

Alsite Aluminum Co., 106 Liberty St., N. Y.

Analytical Chemists.

Britton, J. Blodgett, Philadelphia, Pa.
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

Anti-Friction Metals.—See Babbitt Metal.
Anvils.

Eagle Anvil Works, Trenton, N. J.

Anvil and Vise (Combination).

Fulton Iron & Engine Works, Detroit, Mich.

Apple Parers.

Goodell Co., Antrim, N. H.

Arms and Ammunition.

Hartley & Graham, 313 & 315 Broadway, New York.
Ideal Mfg. Co., New Haven, Conn.
Stevens, J. Arms and Tool Co., Chicopee Falls, Mass.
Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

Auctioneers.

Bissell, E. Son & Co., N. Y.

Axes.

Peck, A. G. & Co., Cohoes, N. Y.

Axes, Springs, &c., Manufacturers of.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.
Wurster, F. W. & Co., Brooklyn, N. Y.

Babbitt Metal.

Crown Smelting Co., Chester, Pa.
Hertz, T. & Son, St. Louis, Mo.
Keys, W. W. & R. M. Co., Bridgeport,
Reeves, Paul S., Philadelphia, Pa.

Bakers and Roasters.

Bronson Supply Co., Cleveland, Ohio.

Bale Ties.

Kilmer Mfg. Co., Newburg, N. Y.

Barb Wire and Fence.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Washburn & Moen Mfg. Co., Worcester.

Bar Iron, Manufacturers of.

Aetna-Standard Iron & Steel Co., Bridgeport, Ohio.
Allentown Rolling Mill, Allentown, Pa.

Burden Iron Co., Troy, N. Y.

Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Montour Iron & Steel Co., Danville, Pa.
Mahoning Valley Iron Co., Youngstown, Ohio.
Sternbergh, J. H. & Son, Reading, Pa.

Barrel Openers.

Specialty Mfg. Co., Hartford, Conn.
Bellows, Manufacturers of.

Scott, Geo. M., Chicago, Ill.

Bells.

Bevin Bros. Mfg. Co., East Hampton.
Belt Dressing.

Jos. Dixon Crucible Co., Jersey City, N. J.

Belt Fasteners.

Bristol Co., Waterbury, Conn.
Claden Mfg. Co., Cleveland, Ohio.
Talcott, W. O., Providence, R. I.

Belting, Makers of.

Alexander Bros., 412 N. 3d, Phila.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Phila., Pa.
Metz Belting Co., Philadelphia, Pa.
N. Y. Belting & Packing Co., Ltd., N. Y.
Roberts Mfg. Co., Pittsburgh, Pa.
Shultz Belting Co., St. Louis, Mo.
Stanley Works, New Britain, Conn.

Bending Rolls.

Wickes Bros., Saginaw, Mich.

Bicycle Locks.

Independent Electric Co., Chicago, Ill.

Bicycles and Bicycle Sundries.

Bevin Bros. Mfg. Co., E. Hampton.
Bridgeport Gun Implement Co., 313-315 Broadway, New York.

Bronson Supply Co., Cleveland, O.
Crawford Mfg. Co., Hagerstown, Md.
Eagle Bicycle Mfg. Co., Torrington, Ct.

Grand Rapids Cycle Co., Grand Rapids, Mich.

Haines & Zimmerman, 407 Cherry Street, Philadelphia.

Harris Mfg. Co., Buffalo, N. Y.

Heath, S. F. Cycle Co., Minneapolis, Minn.

Independent Electric Co., Chicago, Ill.

League Cycle Co., Hartford, Conn.

Lovell, Jno. P. Arms Co., Boston, Mass.

Monarch Cycle Co., Chicago, Ill.

Pope Mfg. Co., Boston, Mass.

Read, Wm. & Sons, Boston, Mass.

Remington Arms Co., 313-315 Broadway, New York.

Stearns, E. C. & Co., Syracuse, N. Y.

Sterling Cycle Works, Chicago, Ill.

Stokes Mfg. Co., Chicago, Ill.

Toledo Metal Wheel Co., Toledo, O.

Bicycle Pumps.

Heath, S. F. Cycle Co., Minneapolis, Minn.

Bit Braces.

Amidon Tool Corp., Buffalo, N. Y.

Blocks, Tackle, Makers of.

Cleveland Block Co., Cleveland, O.

Fulton Iron & Engine Works, Detroit, Mich.

Blowers.

Buffalo Forge Co., Buffalo, N. Y.

Champion Blower & Forge Co., Lancaster, Pa.

Lukens Iron & Steel Co., Coatesville, Pa.

Pottstown Iron Co., Pottstown, Pa.

Boilers, Copper.

Randolph & Clowes, Waterbury, Conn.

Boilers, Steam.

Babcock & Wilcox Co., 30 Cortlandt.

Harrison Safety Boiler Wks., Phila., Pa.

Pollock, W. B. & Co., Youngstown, O.

Southwick Fly. & Mch. Co., Phila., Pa.

Sterling Co., Chicago, Ill.

Wetherill, Robt. & Co., Chester, Pa.

Bolt Cutters.

Chambers Bros. Co., Philadelphia.

Howard Iron Works, Buffalo, N. Y.

Reece, Edw. F., Greenfield, Mass.

Wells Bros. & Co., Greenfield, Mass.

Wiley & Russell Mfg. Co., Greenfield, Mass.

Books.

Williams, David, 96-102 Reade, N. Y.

Wolcott & West, Syracuse, N. Y.

Boring Machines.

Buckeye Mfg. Co., Union City, Ind.

Box Straps and Corners.

Cary Mfg. Co., 5 to 9 Elm St., N. Y.

Boxes, Hdw. Shelf, &c.

Green, A. H., 22 Park Place, N. Y.

Jones, Jess & Co., Philadelphia, Pa.

Bross, Manufacturers of.

Ansonia Brass & Copper Co., N. Y.

Daval, John & Sons, 100 John, N. Y.

Plume & Atwood Mfg. Co., N. Y.

Randolph & Clowes, Waterbury, Conn.

Rome Brass & Copper Co., Rome, N. Y.

Scovill Mfg. Co., Waterbury, Conn.

Waterbury Brass Co., 296 E'way, N. Y.

Brass Butt Hinges.

Tiebout, W. & J., 16 & 18 Chambers.

Brass Founders.

Best, Fox & Co., Pittsburgh, Pa.

Cramp, Wm. & Sons S. & E. B. Co., Philadelphia, Pa.

Eynons Evans Mfg. Co., Philadelphia, Pa.

Fralin, E. T., Lancaster, Pa.

Haight & Clark, Albany, N. Y.

Keys, W. W. & R. M. Co., Bridgeport, Conn.

North Bros. Mfg. Co., Phila., Pa.

Reeves, Paul S., Philadelphia.

Brass Goods.

Brass Goods Mfg. Co., 88 Chambers.

Bridge Builders.

Berlin Iron Bridge Co., East Berlin, Ct.

Bronze (Tobin).

Ansonia Bronze & Copper Co., 19-21 Cliff Street, N. Y.

Brooms and Brushes.

Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.

Butchers' Hardware.

Deitz, A. E., 97 Chambers St., N. Y.

Reading Hdw. Co., Reading, Pa.

Yale & Towne Mfg. Co., Stamford, Ct.

Butchers' Steets.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.

Hoffman, C. & A., Philadelphia, Pa.

Butcher and Shoe Knives, Manufacturers of.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.

Goodell Co., Antrim, N. H.

Wilson, John, Sheffield, England.

Butts and Hinges.

McKinney Mfg. Co., Allegheny, Pa.

Sabin Machine Co., Montpelier, Vt.

Stanley Works, New Britain, Conn.

Tiebout, W. & J., 16 Chambers, N. Y.

Calipers and Dividers.

J. Stevens Arms and Tool Co., Chicopee Falls, Mass.

Starrett, L. S., Athol, Mass.

Car Axles.

Roberts, A. & P. & Co., Phila.

Carboy Stands.

Wolf, W. & L., Philadelphia, Pa.

Carriage Hardware, Makers of.

Covert's Saddlery Works, Farmer, N. Y.

Eccles, Richard, Auburn, N. Y.

McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.

Scranton Forging Co., Scranton, Pa.

Smith, H. D. & Co., Plantsville, Conn.

Wilcox & Howe Co., Birmingham, Conn.

Cartridge Reloading Tools.

Ideal Mfg. Co., New Haven, Conn.

Carver's Tools.

White, Van Glahn & Co., 15-17 Chat-

ham Square, N. Y.

Casters, Wheel, &c.

Clark, G. P., Windsor Locks, Conn.

Castings Cleaning Apparatus.

Tilghman Patent Sand Blast Co., Ltd., Sheffield, England.

Castings, Iron and Steel.

Booth, The Lloyd Co., Youngstown, O.

The Burr & Houston Co., Brooklyn, N. Y.

Cheney, S. & Son, Manlius, N. Y.

Chester Steel Casting Co., Phila.

Chrome Steel Works, Brooklyn, N. Y.

Eureka Cast Steel Co., Chester, Pa.

Flagg, Stanley G. & Co., Phila.

Gardland Foundry Co., Cleveland, O.

Haight & Clark, Albany, N. Y.

King & Andrews Co., Chicago, Ill.

Palmers & De Mooy, Cleveland, O.

Pratt & Cady Co., Hartford, Conn.

Sessions Foundry Co., Bristol, Conn.

Spencer's I. S. Sons, Guilford, Conn.

Standard Fdy. & Hdw. Co., Cleveland, O.

Wetherill, Robert & Co., Chester, Pa.

Castings, Malleable.

Boat, The Lloyd Co., Youngstown, O.

The Burr & Houston Co., Brooklyn, N. Y.

Dayton Malleable Iron Co., Dayton, O.

Hammer & Co., Branford, Conn.

Holloway & Co., New Haven, Conn.

White, L. & I. J. Co., Buffalo, N. Y.

Wetherill, Robert & Co., Chester, Pa.

Wetherill, Wm. & Sons, New Haven, Conn.

Egg Beaters.

North Bros. Mfg. Co., Philadelphia, Pa.
Electric Bells and Supplies.
 Ostrander, W. R. & Co., 204 Fulton St., New York.
 Wollensak, J. F., Chicago, Ill.

Electric Dynamo Machines.

Eddy Electric Mfg. Co., Windsor, Conn.
Elevators, Makers of.
 Link-Belt Engineering Co., Phila., Pa.
 Morse, Williams & Co., Phila., Pa.

Emery and Emery Wheels.

N. Y. Belting & Packing Co., Ltd., N. Y.
 Northampton Emery Wheel Co., Leeds, Mass.
 Norton Emery Wheel Co., Worcester, Mass.
 Sterling Emery Wheel Co., 174 Fulton St., N. Y.
 Sturtevant Mill Co., Boston, Mass.

Emery Wheel Dressers.

Bay State Stamping Co., Worcester, Mass.

Enamels.

Nubian Iron Enamel Co., Cragin, Ill.

Engineers and Contractors.

Aiken, Henry, Pittsburgh, Pa.
 Artificial Gas Engineering Co., Pittsburgh, Pa.
 Herrick, J. A., 284 Pearl St., N. Y.
 Kennedy, Julian, Pittsburgh, Pa.
 Laughlin, Alex. & Co., Pittsburgh, Pa.
 Lean, D. R. Co., Pittsburgh, Pa.
 McClure, Ainsler & Co., Pittsburgh, Pa.
 Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.
 Smythe, S. R. Co., Incorporated, Pittsburgh, Pa.
 Swindell, W. & Bros., Pittsburgh, Pa.

Engines, Gas.

Otto Gas Engine Works, Phila., Pa.
 Rollason Gas Engine, Havemeyer Bldg., N. Y.

Engines, Steam, Makers of.

Bass Foundry & Machine Works, Ft. Wayne, Ind.
 Erie Engine Works, Erie, Pa.
 Norwalk Iron Works Co., So Norwalk, Conn.
 Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
 Phila. Engineering Works, Phila., Pa.
 Southwark Foundry & Machine Co., Phila., Pa.
 Tod, William & Co., Youngstown, O.
 Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.
 Wetherill, Robt. & Co., Chester, Pa.

Exhaust Tumblers.

Sweetser, W. A., Brockton, Mass.

Expansion Bolts.

Boone, W. C. Mfg. Co., Boonton, N. J.
 Church, Isaac, Toledo, O.
 Steward & Romaine Mfg. Co., Phila., Pa.

Faucets, Self-Measuring.

Lane Bros., Poughkeepsie, N. Y.

Faucets, Wooden, Makers of.
 John Sommer's Son, Newark, N. J.**Feed-Water Heaters.**

Davis, I. B. & Son, Hartford, Conn.
 Goubert Mfg. Co., 32 Cortlandt St., N. Y.
 Harrison Safety Boiler Works, Phila., Pa.
 National Pipe Bending Co., New Haven, Conn.
 Taunton Locomotive Mfg. Co., Taunton, Mass.
 Webster, Warren & Co., Camden, N. J.
 Whitlock Coil Pipe Co., Elmwood, Conn.

Fencing, Iron and Wire.

Barnum, E. T., Detroit, Mich.
 Champion Iron Co., Kenton, O.
 Cleveland Fence Co., Indianapolis, Ind.
 Clinton Wire Cloth Co., Clinton, Mass.
 Gilbert & Bennett Mfg. Co., 42 Cliff St.
 Kilmer Mfg. Co., Newburgh, N. Y.
 Mast, Foos & Co., Springfield, O.
 The Van Dorn Iron Works Co., Cleveland, O.

Files, Importers of.

Moss, F. W., 80 John St., N. Y.

Files and Rasps, Manufacturers of.
 Arcade File Works, Anderson, Ind.
 Banker & White, Troy, N. Y.
 Barnett, G. & H., 41 & 43 Richmond, Phila.
 McCaffrey File Co., Philadelphia.
 Nicholson File Co., Providence, R. I.**Fire Brick, Makers of.**

Borgne, Cyrus, Philadelphia, Pa.
 Gardner, Jas. & Son, Cuumberland, Md.
 Kreischer, B. & Sons, foot E. Houston St., N. Y.
 McLeod & Henry Co., Troy, N. Y.
 Maurel, H. & Son, 420 E. 23d, N. Y.
 Ostrander Fire Brick Co., Troy, N. Y.
 Solomon, Jno. M., Wilmington, Del.
 Valentine, M. D. & Bro., Woodbridge.

Fire Doors.

Berlin Iron Bridge Co., E. Berlin, Conn.
 Victor Mfg. Co., Newburyport, Mass.

Fishing Tackle.

Dame, Stoddard & Kendall, Boston, Mass.

Flint and Emery Paper.

Baeder, Adamson & Co., Phila., Pa.

Fly Traps.

Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.

Fine Cleaners.

Mackey, Jas. T., St. Louis, Mo.

Fodder Cutters.

Silver Mfg. Co., Salem, O.

Forges, Portable, &c.

Buffalo Forge Co., Buffalo, N. Y.
 Champion Blower & Forge Co., Lancaster, Pa.
 Foos Mfg. Co., Springfield, Ohio.
 Sturtevant, B. F. Co., Boston, Mass.

Forgings, Iron and Steel.

Bethlehem Iron Co., S. Bethlehem, Pa.
 Cambria Steel-Cambria Iron Co., Johnstown, Pa.
 Frankford Steel Co., Phila., Pa.
 Scranton Forging Co., Scranton, Pa.
 U. S. Projectile Co., Brooklyn, N. Y.

Foundry Facings.

Dixon, Jos., Crucible Co., Jersey City, N. J.
 S. Obermayer Co., Cincinnati, O.
 Smith, J. D., Fdy. Supply Co., Cinn., O.
 Solomon, Jno. M., Wilmington, Del.

Foundry Riddles.

Estey, W. S., 65 Fulton, N. Y.

Foundry Supplies.

Diamond Clamp & Flask Co., Richmond, Ind.
 S. Obermayer Co., Cincinnati, O.
 Smith, J. D., Fdy. Supply Co., Cinn., O.

Friction Clutches.

Brown, A. & F., 17 Dey St., N. Y.
 Keystone Clutch & Mch. Wks., Phila., Pa.
 Moore & White Co., Philadelphia, Pa.

Friction Cone.

Evans Friction Cone Co., Boston, Mass.

Furnaces, Foundry.

Byram & Co., Detroit, Mich.

Gas Governors.

N. Y. Gas Saving Co., Decker Building, Union Square, N. Y.

Gas Producers.

Wood, R. D. & Co., Philadelphia, Pa.

Gas & Steam Fitters' Supplies.
 Pancoast, Henry B. & Co., Phila., Pa.**Gauge, Rolling Mill.**

Haines Gauge Co., Philadelphia, Pa.

Gear Cutters.

D. E. Whiton Mach. Co., New London, Conn.

Gears.

Boston Gear Works, Boston, Mass.
 Poole, Robt. & Son Co., Baltimore, Md.

U. S. Projectile Co., Brooklyn, N. Y.

Glass Boards.

Canton Saw Co., Canton, O.

Glass Cutters.

Monce, S. G., Bristol, Conn.

Glue.

Baeder, Adamson & Co., Phila., Pa.
 Dodd, A. W. & Co., Gloucester, Mass.
 Russia Cement Co., Gloucester, Mass.

Grass Catchers.

Supple Hardware Co., Phila., Pa.

Grinding Mills.

Foos Mfg. Co., Springfield, O.

Grinding and Polishing Machines.

Norton Emery Wheel Co., Worcester, Mass.

Grindstone Dressing Machinery.

Blake & Johnson, Waterbury, Conn.

Grindstones.

Cleveland Stove Co., Cleveland, O.

Gunpowder, Makers of.

Laflin & Rand Powder Co., 29 Murray St., N. Y.

Handles.

New York Mallet and Handle Wks., 456 E. Houston St., N. Y.

Hangers, Door.

Chicago Spring Butt Co., Chicago, Ill.
 Coburn Trolley Track Mfg. Co., Holyoke, Mass.

Lane Bros., Poughkeepsie, N. Y.

Victor Mfg. Co., Newburyport, Mass.

Hardware Comm'n Merchants.

Graham, John H. & Co., 111 Chambers St., New York.

Jacobus, W. H., 90 Chambers, N. Y.

Hardware Manufacturers.

Stearns, C. & Co., Syracuse, N. Y.
 Union Mfg. Co., 103 Chambers, N. Y.

Yale & Towne Mfg. Co., Stamford, Conn.

Hardware Mfrs.' Agents.

Bingham, W. Co., Cleveland, O.

Clarke, Thomas, St. John, N. B.

Graham, John H. & Co., 113 Chambers St., New York.

Sickles, Sweet & Lyon, 35 Barclay, N. Y.

Hardware Specialties.

Acme Shear Co., Bridgeport, Conn.

Bouger Bros., Philadelphia, Pa.

Enterprise Mfg. Co., Philadelphia, Pa.

Ette & Henegar Mfg. Co., St. Louis, Mo.

Haines & Zimmerman, Phila., Pa.

Johnson, J. C., Racine, Wis.

North Bros. Mfg. Co., Philadelphia, Pa.

Peabody & Parks, Troy, N. Y.

Scranton & Co., New Haven, Conn.

Wilson, J. Fred., Worcester, Mass.

Harness Snaps.

Covert Mfg. Co., West Troy, N. Y.
 Coverts' Saddlery Wks., Farmer, N. Y.
 Fitch, W., & E. T., New Haven, Conn.

Hog Rings and Ringers.

Oakes & Irwin, Decatur, Ill.

Hoisting Machines.

Box, Alfred & Co., 314 Green, Phila.
 Brown Hoisting & Conveying Mch. Co., Cleveland, Ohio.

Fulton Iron & Engine Wks., Detroit, Mich.

Harrington, E., Son & Co., Phila.

Lane Bros., Poughkeepsie, N. Y.

Lidgerwood Mfg. Co., 66 Liberty, N. Y.

McCoy, Jos. F. & Co., 26 Warren St.

Maris & Beekley, Philadelphia.

Moore Mfg. & Fdy. Co., Milwaukee, Wis.

Morse, Williams & Co., Phila.

Sellers, Wm. & Co., Phila. and N. Y.

Speidel, J. G., Reading, Pa.

Yale & Towne Mfg. Co., Stamford, Ct.

Hollow Ware.

Avery Stamping Co., Cleveland, O.

Bronson Supply Co., Cleveland, Ohio.

Cleveland Stamping & Tool Co., Cleveland, O.

Stuart & Peterson Co., Phila., Pa.

Hollow Ware, Aluminum.

Illinois Pure Aluminum Co., Lemont, Ill.

Wohler Aluminum Co., Chicago, Ill.

Horse Nails, Makers of.

Capewell Horse Nail Co., Hartford, Conn.

National Horse Nail Co., Vergennes, Vt.

Putnam Nail Co., Neponset, Boston, Mass.

Horse and Mule Shoes, Makers of.

Bryden Horse Shoe Co., Catawsauke, Pa.

Burden Iron Co., Troy, N. Y.

Crescent Horse Shoe & Iron Co., Max Meadows, Va.

Diamond State Iron Co., Wilmington, Del.

Old Dominion Iron & Nail Works Co., Richmond, Va.

Phoenix Horse Shoe Co., Poughkeepsie, N. Y.

Rhode Island Perkins Horse Shoe Co., Providence.

Shoenberger & Co., Pittsburgh, Pa.

Standard Horse Shoe Co., Boston, Mass.

Hose Menders.

Hudson, C. E. & Co., Leominster, Mass.

Jones, M. D. & Co., Boston, Mass.

Hose.

Cleveland Rubber Works, Cleveland, O.

N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.

Hydrants, &c.

McLean, John, 296 & 298 Monroe, N. Y.

Hydraulic Forging.

U. S. Projectile Co., Brooklyn, N. Y.

Hydraulic Jacks.

Dudgeon, Richard, 24 Columbia, N. Y.

McCoy, Jos. F. Co., 26 Warren St., N. Y.

Ice Breakers.

Clement & Dunbar, Philadelphia, Pa.

Wharton, Jos. S., Lovering, Phila., Pa.

Ice Cream Cans.

Stuart & Peterson Co., Phila., Pa.

Ice Cream Freezers.

Clement & Dunbar, Phila., Pa.

North Bros. Mfg. Co., Phila., Pa.

Packer, C. W., Philadelphia, Pa.

White Mountain Freezer Co., Nashua, N. H.

Injectors.

Evon-Evans Mfg. Co., Philadelphia, Pa.

Jenkins Bros., New York.

Insurance, Boiler.

Bartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Iron and Steel, Swedish.

Lundberg, Gustaf, Boston, Mass.

Milne, A. & Co., 1 Broadway, N. Y.

Iron Commission Brokers.

Corning, Edw. & Co., 29 Broadway, N. Y.

Cotton, Barclay W. & Co., Phila.

Etting, Edw. J., Philadelphia.

Hogan, John L. & Co., Philadelphia.

Hoffman, J. W. & Co., Philadelphia.

Levy, Henry & Co., Philadelphia.

Levy, Jerome & Co., Philadelphia.

Leia, J. Tatmann & Co., Philadelphia.

Mohr, J. J., 43 Walnut, Philadelphia.

Pilling & Crane, Philadelphia, Pa.

Wister, L. R. & Co., Phila., Pa.

Iron Ore.

Samuel, Frank, Philadelphia, Pa.

Iron, Merchants.

Barnes, C. K. & Co., Philadelphia, Pa.

Borden & Lovell, 70 West, N. Y.

Bussentius & Cuffline, Philadelphia, Pa.

Corning, Edw. & Co., 29 Broadway, N. Y.

Cox, Justice, Jr., Philadelphia.

Cotton, Barclay W. & Co., Phila.

Hoffman, J. W. & Co., Philadelphia.

Leonard, J., 446 West St., N. Y.

Nicolls, Wheeler & Co., Philadelphia.

Ogden & Wallace, 85 Elm St., N. Y.

Pierson & Co., 29 Broadway, N. Y.

Thomson, W. H. & Co., Phila., Pa.

Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.

Whitney, A. R. & Co., 17

Place, Geo., 120 Broadway, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.
Powell Planer Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Prentiss Tool & Supply Co., N. Y.
Scranton Supply & Mfg. Co., Scranton, Pa.
Sellers, Wm. & Co., Phila.
Seyfert's Sons, L. F., Philadelphia, Pa.
Stepto, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., Ltd., Phila.
Toomey, Frank, Philadelphia, Pa.
Wetherill, Robert & Co., Chester, Pa.
Wickes Bros., Saginaw, Mich.
Wilson, W. A., Rochester, N. Y.

Machinery for Hardware Manufacturers.

Adt, Jno. & Son, New Haven, Conn.

Machine Knives.

Loring, Coes & Co., Worcester, Mass.
Loyd, John, 558-562 Water St., N. Y.
Simonds Mfg. Co., Fitchburg, Mass.

Machine Tools.—See Machinery.

Machine Work.

Papping, J., 58th St. & 11th Ave., N. Y.
City.

Machinists' Scales

Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S., Athol, Mass.

Machinists' Tools and Supplies.

King, J. M. & Co., Waterford, N. Y.
Sellers, Wm. & Co., Inc., Phila.

Mallets.

N. Y. Mallet & Handle Works, N. Y.

Mangels.

Johnson, S. C., Racine, Wis.

Manufacturing Sites.

Illinois Central R. R., Chicago, Ill.

Measuring Tapes.

Keuffel & Esser Co., N. Y.
Lufkin Rule Co., Saginaw, Mich.

Mechanical Instruction.

Correspondence School of Mechanics,
Scranton, Pa.

Metals.

Fearing, Wm. S., 100 Chambers, N. Y.
Hendricks Bros., 49 Cliff, N. Y.

Metal Brokers.

American Metal Co., N. Y.

Metallurgists.

Britton, J. Blodgett, Phila., Pa.

Mincing Knives.

Palmer Hdw. Mfg. Co., Troy, N. Y.

Mine Lamps.

Darby, Edw. & Sons, Phila., Pa.

Leonard, B. E., Scranton, Pa.

Mining Screens.

Harrington & King Perforating Co.,
Chicago, Ill.
Howard & Morse, 45 Fulton, N. Y.

Models, Makers of.

Franklin, H. H. Mfg. Co., Syracuse,
N. Y.
Ideal Machine Works, Hartford, Conn.
Rhodes, L. E. Co., Hartford, Conn.

Molding Sand.

Obermayer, S. Co., Cincinnati, O.

Motors, Water and Electric.

C. & C. Electric Co., 402 and 404
Greenwich St., N. Y.

Dallett, Thomas H. & Co., Phila., Pa.

Nail Machinery.

Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nail and Tack Pullers.

Graham, John H. & Co., 113 Chambers
Street, N. Y.
Scranton & Co., New Haven, Conn.
Specialty Mfg. Co., Hartford, Conn.

Nails (Cut) and Spikes.

Borden & Lovell, 70 West, N. Y.
Cumberland Nail & Iron Co., Phila.
Pottstown Iron Co., Pottstown, Pa.
Riverside Iron Wks., Wheeling, W. Va.
Valley Steel Co., St. Louis, Mo.

Nickel Platers' Supplies.

Eddy Electric Mfg. Co., Windsor, Conn.

Norway Shapes, Rollers of.

Rowland, William & Harvey, Frank-
ford, Philadelphia.

Novelty Manufacturers.

Franklin, H. H. Mfg., Syracuse, N. Y.
Ideal Machine Works, Hartford, Conn.

Nut Machines.

Dunham Nut Co., Unionville, Ct.

Nuts, Bolts, &c., Makers of.

American Bolt Co., Lowell, Mass.
American Screw Co., Providence, R. I.

Blake & Johnson, Waterbury, Conn.
Dunham Nut Co., Unionville, Conn.

Haskell, Wm. H. Co., Pawtucket, R. I.
Mt. Carmel Bolt Co., Mt. Carmel, Conn.
Pennsylvania Bolt & Nut Co., Lebanon, Pa.

Port Chester Bolt & Nut Co., Port
Chester, N. Y.

Russell, Burdsall & Ward, Port
Chester, N. Y.

Sternbergh, J. H. & Son, Reading, Pa.

Wilson, J. Fred., Worcester, Mass.
Wm. H. Haskell Co., Pawtucket, R. I.

Oilers.

Wilmet & Hobbs Mfg. Co., Bridgeport,
Conn.

Oil Stones.

Pike Mfg. Co., Pike Station, N. H.

Oil Stoves.

Glazier Stove Co., Chelsea, Mich.

Ores.

Wister, Francis, Philadelphia, Pa.

Ox Bow Pins.

Sawyer, O. C., Sharon, Vt.

Ox Shoes.

Scranton Forging Co., Scranton, Pa.

Packing.

Morrison, Robert, St. Louis, Mo.
N. Y. Belting & Packing Co., Ltd., N. Y.

Padlocks.

Ames Sword Co., Chicopee, Mass.

Fraim, E. T., Lancaster, Pa.

Wolf, W. & L., Phila., Pa.

Shultze Mfg. Co., Phila., Pa.

Paint.

Garry Iron & Steel Roofing Co., Cleve-
land, O.

Paint Burners.

Dangler Stove & Mfg. Co., Cleveland,
Ohio.

Paint Cans.

Wilmet & Hobbs Mfg. Co., Bridgeport,
Conn.

Pants Stretcher.

Covert Mfg. Co., West Troy, N. Y.

Patent Solicitors.

Butler, C. N., Phila., Pa.
Howson & Howson, Philadelphia and
Washington.

Jenner, H. W. T., Washington, D. C.
Stocking, E. B., Washington, D. C.

Perforated Metal.

Clinton Wire Cloth Co., Clinton, Mass.
Harrington & King Perforating Co.,
Chicago, Ill.

Hendrick Mfg. Co., Ltd., Carbondale,
Pa.

Phosphor Bronze.

Phosphor Bronze Smelting Co., Lim-
ited, Philadelphia.

Phosphor Tin.

Crescent Phosphorized Metal Co.,
Philadelphia, Pa.
Halk & Naumann, 516 Pearl, N. Y.

Picks and Mattocks.

Plumb, Fayette R., Philadelphia, Pa.

Pig Iron.

Houston, C. B. & Co., Philadelphia, Pa.

Montour Iron & Steel Co., Danville, Pa.

Naylor & Co., 45 Wall, N. Y.

Pilling & Crane, Philadelphia, Pa.

Samuel, Frank, Philadelphia, Pa.

Pig Iron Storage.

Am. Pig Iron Storage Warrant Co.,
44 Wall, N. Y.

Pile Drivers.

Vulcan Iron Works, Chicago, Ill.

Pipe Bent.

National Pipe Bending Co., New
Haven, Conn.

Pipe Cutting and Threading Ma-

chines.

Armstrong Mfg. Co., Bridgeport, Conn.

Bignal & Keeler Mfg. Co., St. Louis,
Mo.

Derrick & Harvey Mch. Co., Baltimore,
Md.

Merrill Mfg. Co., Toledo, O.

Pancoast, Henry B. & Co., Phila.

Saunder's Sons, D., Yonkers, N. Y.

Walworth Mfg. Co., Boston, Mass.

Pipe Grips.

Prentiss Vise Co., 44 Barclay, N. Y.

Pipes, Fittings, &c., Makers of.

McNab & Harlin Mfg. Co., N. Y.

Pipe, Water and Gas, Makers of.

Cumberland Nail & Iron Co., Phila., Pa.

Donaldson Iron Co., Ennies, Pa.

Riverside Iron Works, Wheeling, W. Va.

Wood, R. D. & Co., Philadelphia, Pa.

Plane Irons, Manufacturers of.

Buck Bros., Millbury, Mass.

Buch, Chas., Millbury, Mass.

Planers.

Derrick & Harvey Mch. Co., Baltimore,
Md.

Powell Planer Co., Worcester, Mass.

Wilson, W. A., Worcester, Mass.

Planes, Manufacturers of.

Stanley Rule & Level Co., N. Y.

Planter and Hoe.

Ayers, J. R., Petersburg, Va.

Plated Ware.

Boardman, L. & Son, New Haddam, Ct.

Holmes & Edwards Silver Co., Bridge-
port, Conn.

Kelley & McBean, Niagara Falls, N. Y.

Rogers, Wm. Mfg. Co., Hartford, Ct.

Plate, Iron and Steel, Mfrs. of.

Aetna-Standard Iron & Steel Co.,
Bridgeport, O.

Lukens Iron & Steel Co., Coatesville,
Pa.

Mahoning Valley Iron Co., Youngs-
town, Ohio.

Moorhead-McLean Co., Pittsburgh, Pa.

McIlvain & Sons, Reading, Pa.

Pottstown Iron Co., Pottstown, Pa.

Pottsville Iron & Steel Co., Pottsville,
Pa.

Wood, Clark & Drew, Plymouth, Mass.

Clark & Cowles, Plainville, Conn.

Townsend, W. P. & Co., New Brighton,
Pa.

Riveting Machines.

Adt, Jno. & Sons, New Haven, Conn.

Rock Drills.

Band Drill Co., 23 Park Place, N. Y.

Rolling Mill Machinery.

Birmingham Iron F'dry, Birmingham,
Conn.

Booth, The Lloyd Co., Youngstown, O.

Leechburg Foundry & Mch. Co., Pitts-
burgh, Pa.

Wood, Alan Co., Philadelphia.

Morgan Construction Co., Worcester,
Mass.

Robinson-Rea Mfg. Co., Pittsburgh.

Totten & Hogg Iron and Steel F'dry. Co.,
Pittsburgh, Pa.

Trethewey Mfg. Co., Pittsburgh, Pa.

Waterbury Farrel Foundry & Mch.
Co., Waterbury Conn.

Waterbury Farrel Foundry & Mch.
Co., Waterbury Conn.

Pokes.

Bishop, A. W., Berea, Ohio.

Polishing Machines.

Watson & Stillman, 204 E. 42d, N. Y.

Post Hole Diggers.

Buckeye Mfg. Co., Union City, Ind.

Gibbs Mfg. Co., Canton, Ohio.

Wister, L. & R. & Co., Phila., Pa.

Witten & Hogg Iron and Steel F'dry. Co.,
Pittsburgh, Pa.

- Allentown Rolling Mill, Allentown, Pa.** Lockhart Iron & Steel Co., Pittsburgh, Pa.
- Passaic Rolling Mill Co., Paterson, N.J.** Pottsville Iron & Steel Co., Pottsville, Pa.
- Roberts, A. & P. & Co., Phila., Pa.** The Phoenix Iron Co., Phila., Pa.
- Shears and Scissors.** Acme Shear Co., Bridgeport, Conn. Heimisch's, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.** Aetna-Standard Iron and Steel Co., Bridgeport, O. Cambridge Iron & Steel Co., Cambridge, Ohio. Chess Bros., Pittsburgh, Pa. Mahoning Valley Iron Co., Livingston, Ohio. Morehead-McClean Co., Pittsburgh. Pier & Co., 29 Broadway, N. Y. Singer, Nimick & Co., Ltd., Pittsburgh, Pa. The Mahoning Valley Iron Co., Youngstown, O. Alan Wood Co., Philadelphia. W. Dewees Wood Co., McKeesport, Pa.
- Sheet Zinc.** Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Sinks.** Douglas, W. & B., Middletown, Conn.
- Skates, Ice.** Lovell, Jno. P. Arms Co., Boston, Mass. Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.** Henley, M. C., Richmond, Ind. Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Smelting Works.** Reeves, Paul S., 760 S. Broad, Phila.
- Soldering Coppers.** Clendenin Bros., Baltimore, Md. Covert Mfg. Co., West Troy, N. Y.
- Speaking Tubes.** Ostrander, W. R. & Co., 204 Fulton St., N. Y. Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.** Rhodes, L. E. Co., Hartford, Conn.
- Spelter.** Matthiessen & Hegeler Zinc Co., La Salle, Ill. Missouri Metal Co., St. Louis, Mo.
- Spoons and Forks.** Boardman, L. & Son, New Haddam, Conn. Holmes & Edwards Silver Co., Bridgeport, Conn. Kelley & McBean, Niagara Falls, N. Y. Rogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.** Hartley & Graham, 313-315 B'way, N.Y.
- Springs.** Clark & Cowles, Plainville, Ct. Dunbar Bros., Bristol, Conn. Miller & Van Winkle, Brooklyn, N. Y. Morgan Spring Co., Worcester, Mass. Roland, Wm. & Harvey, Phila., Pa. Sabin Machine Co., Montpelier, Vt. Washburn & Moen Mfg. Co., Worcester, Mass. Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.** Bommer Bros., Brooklyn, N. Y. Chicago Spring Butt Co., Chicago, Ill. Fullman Sash Balance Co., Rochester, N. Y. Stover Mfg. Co., Freeport, Ill. Van Wagoner & Williams Hdw. Co., 14 Warren St., N. Y.
- Stamped Ware.** Am. Stamping Co., 104 & 106 John St., New York.
- Stamping Works.** Avery Stamping Co., Cleveland, O. Cleveland Stamping & Tool Co., Cleve-land, O.
- Staples.** Cobb & Drew, Plymouth, Mass. Titchener, E.H. & Co., Binghamton, N.Y.
- Steam Gauges.** Bristol Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.** Dienelt & Eisenhardt, Philadelphia. Dugeon, Richard, 24 Columbia Street, N. Y. Trethewey Mfg. Co., Pittsburgh, Pa.
- Steam Heating.** Webster, Warren & Co., Camden, N. J.
- Steam Separators.** Goubert Mfg. Co., 32 Cortland St., N.Y. Harrison Safety Boiler Wks., Phila., Pa. Webster, Warren & Co., Camden, N. J.
- Steam Specialties.** Lunkenheimer Co., Cincinnati, O.
- Steel, Cold Rolled Strip.** Superior Steel Co., Pittsburgh, Pa. Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.** Krogsgard, W., 61 Fulton St., N.Y.
- Steel Importers.** Abbott, Wheelock & Co., N. Y. and Boston. Hobson, Francis, Seaman & Co., 97 John St., N. Y. Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y. Milne, A. & Co., 1 Broadway, N. Y. Newton & Shipman, 88 John, N. Y. Wetherell Bros., 93 Liberty St., N. Y. Whitney, A. R. & Co., B'dway, N. Y. Wolff, R. H. & Co., Ltd., 18th Street and Harlem River, N. Y.
- Steel (Musher's Special).** Jones, B. M. & Co., Boston.
- Steel Manufacturers.** Aetna-Standard Iron & Steel Co., Bridgeport, O. Bethlehem Iron Co., S. Bethlehem, Pa. Boker, Hermann & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa. Chester Steel Castings Co., Phila., Pa. Chrome Steel Works, Brooklyn, N. Y. Crescent Steel Co., Pittsburgh, Pa. Frankford Steel Co., Philadelphia. Gautier Steel Department of Cambria Iron Co., Johnstown, Pa. Hobson, Francis, Seaman & Co., 97 John St., N. Y. Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y. Kayser, Ellison & Co., Sheffield, Eng. La Belle Steel Co., Pittsburgh, Pa. Lukens Iron & Steel Co., Coatesville, Pa. Moorhead-McClean Co., Pittsburgh, Pa. Moss, F. W., 83 John, N. Y. Pottsville Iron and Steel Co., Pottsville, Pa. Bowland, Wm. & Harvey, Frankford, Philadelphia. Singer, Nimick & Co., Pittsburgh. Superior Steel Co., Pittsburgh, Pa. Valley Steel Co., St. Louis, Mo. Wordlaw, S. & C., Sheffield, Eng. Wetherell Bros., 93 Liberty, N. Y. Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.** Barnes, C. K. & Co., Philadelphia, Pa. Corning, Edw. & Co., 29 B'way, N. Y. Lindsay, Jas. G. & Co., Phila., Pa. Pier & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.** Bethlehem Iron Co., S. Bethlehem, Pa. Cambria Iron Co., Johnstown, Pa. Montour Iron & Steel Co., Danville, Pa. Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.** Frankford Steel Co., Philadelphia, Pa. Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y. Jones, B. M. & Co., Boston, Mass. La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders.** Bicycle Step Ladder Co., Chicago, Ill. Croissant, M., Albany, N. Y.
- Stocks and Dies.** Armstrong Mfg. Co., Bridgeport, Conn. Billings & Spencer Co., Hartford, Conn. Butterfield & Co., Derby Line, Vt. Hart Mfg. Co., Cleveland, O. Saunders' Sons, D., Yonkers, N. Y. Wells Bros. & Co., Greenfield, Mass. Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stove Linings.** Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.** Cheney, S. & Son, Manlius, N. Y.
- Street Lamps.** Steam Gauge & Lantern Co., Syracuse, N. Y.
- Straps.** J. R. Torrey & Co., Worcester, Mass.
- Structural Iron Work.** Berlin Iron Bridge Co., East Berlin, Conn. Lindsay, Jas. G. & Co., Phila., Pa.
- Sulphuric Acid.** Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.** Atlas Tack Corporation, Boston, Mass. Cledenin Bros., Baltimore, Md. Cobb & Drew, Plymouth, Mass. Grand Crossing Tack Co., Grand Crossing, Ill.
- Taps and Dies.** Butterfield & Co., Derby Line, Vt. Carpenter, J. M., Tap & Die Co., Pawtucket, R. I. Manning, Maxwell & Moore, 111 Liberty St., N. Y. Wells Bros. & Co., Greenfield, Mass. Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.** Riehle Bros. Testing Mach. Co., Philadelphia.
- Testing Machines.** Riehle Bros. Testing Mach. Co., Phila.
- Theatrical Hardware.** Wollensak, J. F., Chicago, Ill.
- Thill Springs.** Frost Thill Spring Co., Boston, Mass. Sabin Machine Co., Montpelier, Vt.
- Timber and Mineral Lands.** Robertson, E. Co., Cincinnati, O.
- Time Record.** Scattergood, H. W., Phila., Pa.
- Tin Plate Machinery.** Lloyd Booth Co., Youngstown, Ohio.
- Tinware.** Am. Stamping Co., 104 & 106 John St.
- Tire Upsetters.** Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.** Burke, F. F., Boston, Mass.
- Tool Blocks.** Hubert-Rogers Mch. Co., South Sudbury, Mass.
- Tool Chests.** Am. Tool Co., 200 W. Houston St., N.Y.
- Tool Holders.** Armstrong Bros. Tool Co., Chicago, Ill.
- Tools.** Britton, Horace E., Stoughton, Mass. Brown, R. H. & Co., New Haven, Conn. Mayhew, H. H. Co., Shelburne Falls, Mass. Millers Falls Co., 93 Read, N. Y. Richardson, C. F. & Son, Athol, Mass. Stanley Rule & Level Co., 29 Chambers. Starrett, L. S., Athol, Mass. Wilkinson, A. J. & Co., Boston, Mass.
- Tools, Blacksmith and Wheelwright.** Buffalo Forge Co., Buffalo, N. Y. Butts & Ordway, Boston, Mass. Champion Blower & Forge Co., Lancaster, Pa. Plumb, Fayette R., Philadelphia, Pa. Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'.** Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasoline.** Dangler Stove & Mfg. Co., Cleveland, O. Schneider & Trenkamp Co., Cleveland, Ohio. Standard Lighting Co., Cleveland, O.
- Transom Lifters.** Wollensak, J. F., Chicago, Ill.
- Tricycles.** Toledo Metal Wheel Co., Toledo, Ohio.
- Trucks, Manufacturers of.** Clark, G. F., Windsor Locks, Conn.
- Tubes, Seamless Drawn Copper.** Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y. Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.** Leng's, John S. Son & Co., 4 Fletcher St., New York. U. S. Projectile Co., Brooklyn, N. Y.
- Tumbling Barrels.** Henderson Bros., Waterbury, Conn.
- Turnbuckles.** Cleveland City Forge & Iron Co., Cleveland, O. Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.** Cleveland Twist Drill Co., Cleveland. Morse Twist Drill & Machine Co., New Bedford, Mass. New Process Twist Drill Co., Taunton, Mass. Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.** Best, Fox & Co., Pittsburgh, Pa. Chapman Valve Mfg. Co., Boston. Eynon-Evans Mfg. Co., Philadelphia, Pa. Jenkins Bros., 71 John, N. Y. Lunkenheimer Co., Cincinnati, O. McNab & Harlin Mfg. Co., 56 John, N. Y.
- Ventilator Appliances.** Howard & Morse, 15 Fulton St., N. Y.
- Vise Jaws.** Newark Mch. Tool Co., Newark, N. J.
- Vises.** Athol Machine Co., Athol, Mass. Hollands Mfg. Co., Erie, Pa. Howard Iron Works, Buffalo, N. Y. Millers Falls Co., 93 Readie St., N. Y. Prentiss Rule Co., 44 Barclay, N. Y.
- Wagon Jacks.** Covert Mfg. Co., West Troy, N. Y. Covert's Saddlery Works, Farmer, N.Y.
- Washers.** Haskell, Wm. H. Co., Pawtucket, R. I. Milton Mfg. Co., Milton, Pa. Sternbergh, J. H. & Son, Reading, Pa.
- Washing Machines.** Benbow Mfg. Co., St. Louis, Mo.
- Water Meters.** Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.** Poole, Robt. & Son Co., Baltimore, Md.
- Wheelbarrows.** Amer. Steel Scraper Co., Sidney, Ohio. Byran Mfg. Co., Byran, Ohio. Kilbourne & Jacobs Mfg. Co., Columbus, Ohio. Sidney Steel Scraper Co., Sidney, O.
- Window Cleaners.** Bourke Mfg. Co., Youngstown, O.
- Window Cord, Makers of.** Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.** Gautier Steel Department of Cambria Iron Co., Johnstown, Pa. Miner & Van Winkle, Brooklyn, N. Y. New Castle Wire Nail Co., New Castle, Pa.
- New Haven Wire Mfg. Co., New Haven, Conn.** System Wire Nail Co., Salem, O. Trenton Iron Co., Trenton, N. J. Washburn & Moen Mfg. Co., Worcester. Wetherell Bros., 93 Liberty St., N. Y. Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y. Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.** Barnum, E. T., Detroit, Mich. Clinton Wire Cloth Co., Clinton, Mass. Darby, Edward & Sons, Philadelphia. Estey, W. S., 65 Fulton, N. Y. Gilbert & Bennett Mfg. Co., 42 Cliff. Howard & Morse, 45 Fulton, N. Y. N. J. Wire Cloth Co., Trenton, N. J. Scheeler & Sons, Buffalo, N. Y. Wickwire Bros., Cortland, N. Y. Wright & Colton Wire Cloth Co., Worcester, Mass. W. S. Tyler Wire Works Co., Cleve'd.
- Wire Cutters.** Higganum Hdw. Co., Higganum, Conn. King, J. M. & Co., Watertown, N. Y.
- Wire Dies.** McFarland, Wm., Trenton, N. J. Newton & Shipman, 83 John St., N. Y.
- Wire Fences, See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.** Bromwell Brush & Wire Goods Co., Cincinnati, Ohio. Darby, Edward & Sons, Phila. Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y. Ludlow-Saylor Wire Co., St. Louis. Ossawa Mills Co., Norwich, Conn. Scheeler & Sons, Buffalo, N. Y. Wickwire Bros., Cortland, N. Y. Williamson, C. T., Wire Novelty Co., Newark, N. J. Wire Goods Co., Worcester, Mass.
- Wire Machinery.** Am. Tool Wks., Cleveland, O. Manville, E. J. Mch. Co., Waterbury, Ct. Morgan Construction Co., Worcester, Mass. Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.** Adt, John & Son, New Haven Conn.
- Wire Nails.** Bond Nail Co., Raynham, Mass. Indiana Wire Fence Co., Crawfordsville, Ind. Klimre Mfg. Co., Newburg, N. Y. New Castle Wire Nail Co., New Castle, Pa. Phillips, Townsend & Co., Phila., Pa. Salem Wire Nail Co., Salem, O. Taunton Wire Nail Co., Taunton, Mass. Whitney, A. R. & Co., New York City.
- Wire Rods, Steel.** New Castle Wire Nail Co., New Castle, Pa. Washburn & Moen Mfg. Co., Worcester, Mass. Whitmore, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel, Makers.** Broderick & Bascomb Rope Co., St. Louis, Mo. California Wire Works, San Francisco. Hazard Mfg. Co., Wilkesbarre, Pa. A. Leschen & Sons Rope Co., St. Louis. Trenton Iron Co., Trenton, N. J. Washburn & Moen Mfg. Co., Worcester, Mass. Williamsport Wire Rope Co., Williamsport, Pa.
- Wire Rope Machinery.** Kay, J. F., Passaic, N. J.
- Wood-Working Machinery.** Fay, J. A. & Co., Cincinnati, O. Seneca Falls Mfg. Co., Seneca Falls, N.Y. Wilkinson, A. J. & Co., Boston, Mass.
- Wrenches, Manufacturers of.** Bemis & Call Hardware & Tool Co., Springfield, Mass. Billings, Spencer & Co., Hartford, Conn. Coes Wrench Co., Worcester, Mass. Trimont Mfg. Co., Roxbury, Pa. Walworth Mfg. Co., Boston, Mass. Williams, J. H., Brooklyn, N. Y.
- Wringers.** Colby Wringer Co., Montpelier. National Wringer Co., Canton, O.

ALPHABETICAL INDEX TO ADVERTISERS.

Abbott, Wheelock & Co.....	17	Bronson Supply Co.....	73	Cresson, Geo. V. Co.....	41	Graham, John H. & Co.....	72
Alsite Aluminum Co	14	Brown, A. & F.....	41	Croissant, M.....	72	Grand Crossing Tack Co.....	10
Acme Shear Co.....	65	Brown, E. E. & Co.....	77	Crosby, G. A. & Co.....	36	Grand Rapids Cycle Co.....	70
Adt, John & Son.....	46	Brown Holisting & Conveying Mch. Co.....	33	Cross & Speirs Machine Co.....	36	Green, A. H.....	87
Aetna-Standard Iron & Steel Co.	19	Brown, R. H. & Co.....	56	Crown Smelting Co.....	3	Haight & Clark.....	24
Aiken, Henry.....	25	Bryan Mfg. Co.....	84	Cumberland Nail & Iron Co.....	16	Haines & Zimmermann.....	70
Alexander Bros.....	34	Bryden Horse Shoe Co.....	79	Cushman Chuck Co.....	40	Haines Gauge Co.....	22
Allentown Rolling Mills.....	26	Buck Bros.....	65	Dallett, Thos. H. & Co.....	42	Halk & Naumann.....	3
Am. Bolt Co.....	87	Buck, Chas.....	65	Dame, Stoddard & Kendall.....	68	Halsey, Jas. T.....	40
Am. Metal Co.....	3	Buckeye Mfg Co.....	84	Dangler Stove & Mfg. Co.....	69	Halsey, W. S. & Co.....	23
Am. Pig Iron & Storage Warrant Co.	18	Buffalo Forge Co.....	96	Darby, Edw. & Sons.....	8	Hamilton Machine Tool Co.....	46
Am. Screw Co.....	12	Buffalo Scale Co.....	82	Davis, I. B. & Son.....	28	Hammer & Co.....	82
Am. Stamping Co.....	67	Burden Iron Co.....	79	Davis, W. P.....	48	Hardware Board of Trade.....	51
Am. Steel Scraper Co.....	84	Burke, P. F.....	81	Davol, John & Sons.....	2	Harrington, E., Son & Co.....	43
Am. Tool Co.....	65	Burr & Houston Co.....	22	Dayton Malleable Iron Co.....	96	Harrington & King Perforating Co.	9
American Tool Works.....	48	Bussenius & Cunliffe.....	48	Dean Bros. Steam Pump Works....	32	Harris Mfg. Co.....	70
Ames Sword Co.....	76	Butler, C. N.....	6	Decatur Shaft Support Co	68	Harrison Safety Boiler Wks.....	27
Amidon Tool Corporation.....	64	Butterfield & Co.....	40	Deitz, A. E.....	74	Hart Mfg. Co.....	40
Ansonia Brass & Copper Co.....	2	Butts & Ordway.....	44	Deming Co.....	58	Hartford Steam Boiler Insp. and Ins. Co.....	29
Arcade File Works.....	62	Byram & Co.....	26	Detrick & Harvey Machine Co.....	45	Hartley & Graham.....	1
Arcade Malleable Iron Co.....	21	C. & C. Electric Co.....	29	Detroit Foundry Equipment Co	23	Haskell, Wm. H. Co.....	88
Armstrong Bros. Tool Co.....	38	Caldwell Mfg. Co.....	76	Diamond Clamp & Flask Co.....	96	Hazard Mfg. Co.....	6
Armstrong Mfg. Co.....	39	California Wire Works.....	6	Diamond State Iron Co.....	79	Heath, S. F. Cycle Co	70
Artificial Gas Engineering Co.	25	Cambria Iron Co.....	18	Dienelt & Eisenhardt.....	37	Heinisch's R Sons Co.....	65
Athol Machine Co.....	59	Cambridge Iron & Steel Co.....	19	Dietz, Schumacher & Co.....	38	Henderer, A. L.....	35
Atlas Tack Corporation.....	10	Cambridge Roofing Co.....	14	Dille & McGuire Mfg. Co.....	86	Henderson Bros.....	22
Avery Stamping Co.....	69	Canfield, H. O.....	34	Disston, Henry & Sons.....	61	Hendey Machine Co.....	54
Ayers, J. R.....	85	Canton Saw Co.....	87	Dixon, Jos., Crucible Co.....	34	Hendricks Bros.....	2
Babcock & Wilcox Co.....	31	Capewell Horse Nail Co.....	80	Dodd, A. W. & Co.....	95	Hendrick Mfg. Co., Ltd.....	7
Baeder, Adamson & Co.....	56	Carbon Steel Co.....	19	Dodge Mfg. Co.....	53	Hendryx, A. B. Co.....	3
Banker & White	63	Carlin's Sons, Thomas.....	48	Donaldson Iron Co.....	22	Henley, M. C.....	86
Bardsley, J.....	82	Carpenter, J. M. Tap & Die Co.	95	Douglas, W. & B.....	58	Herrick, J. A.....	26
Barns, C. K. & Co.....	21	Cary Mfg. Co.....	87	Draper Machine Tool Co.....	48	Hiertz, T. & Son.....	4
Barnes, W. F. & John.....	36	Chadborns & Coldwell Mfg. Co.....	86	Dudgeon, Richard.....	38	Higginanum Hdwy. Co	64
Barnett, G. & H.....	63	Chambers Bros. Co.....	88	Dunbar Bros.....	5	Hill, Clarke & Co.....	49
Barnum, E. T.....	9	Champion Blower & Forge Co.....	40	Dunham Nut Co.....	87	Hobson, F., Seaman & Co.....	17
Bass Foundry & Machine Works....	27	Champion Iron Co.....	7	Dupont Mfg. Co.....	35	Hoffman, C. & A.....	64
Bay State Stamping Co.....	43	Chapman Valve Mfg. Co.....	29	Durant, W. N.....	33	Hoffman, J. W. & Co.....	16
Bellevue Pump Co.....	59	Chatillon, John & Sons.....	73	Dwight slate Machine Co.....	39	Hogan, John L. & Co.....	16
Bement, Miles & Co.....	37	Cheney, S. & Son.....	22	Eagle Anvil Works.....	62	Hoggson & Pettis Mfg. Co.	41
Bemis & Call Hardware & Tool Co.	82	Chess Bros.....	22	Eagle Bicycle Mfg Co.....	95	Hollands Mfg. Co.....	59
Benbow Mfg. Co	74	Chester Steel Casting Co.....	23	East Chicago Foundry Co.....	22	Holmes & Edwards Silver Co.....	66
Berger Bros.....	73	Chicago Spring Butt Co.....	75	Eccles, Richard.....	77	Hooker-Colville Steam Pump Co.	49
Berlin Iron Bridge Co.....	11	Chrome Steel Works.....	18	Eddy Electric Mfg. Co.....	29	Houston, C. B. & Co.....	16
Best, Fox & Co.....	3	Church, Isaac.....	88	Enterprise Mfg. Co. of Pa.....	69	Erie Engine Works.....	28
Bethlehem Iron Co.....	21	Cincinnati Corrugating Co.....	14	Estey, W. S.....	6	Howard & Morse.....	7
Bevin Bros. Mfg. Co.....	71	Clafren Mfg. Co.....	34	Ette & Henger Mfg. Co.....	85	Howson & Howson.....	6
Bickford Drill & Tool Co.....	44	Clapp, Geo. M.....	49	Etting, Edw. J.....	16	Hudson, C. E. & Co.....	74
Bicycle Step Ladder Co.....	74	Clark, G. P.....	87	Eureka Cast Steel Co.....	96	Huebner Screen Door Co.....	68
Bigelow, C. R.....	49	Clark & Cowles.....	4	Evans-Friction Cone Co.....	3	Hurlbut-Rogers Mch. Co.....	45
Bignal & Keeler Mfg. Co.....	37	Clarke, Thomas.....	73	Eynon-Evans Mfg. Co.....	29	Ideal Machine Works.....	53
Billings & Spencer Co.....	82	Clement & Dunbar.....	57	F. & N. Mfg. Co.....	86	Ideal Mfg. Co.....	70
Bingham, W. Co.....	70	Clendenin Bros.....	13	Fairmount Machine Co.....	45	Illinois Pure Aluminum Co.....	67
Birmingham Iron Foundry.....	22	Cleveland Block Co.....	77	Fay, J. A. & Co.....	53	Independent Electric Co.....	71
Bishop, A. W.....	76	Cleveland City Forge & Iron Co.	1	Fearing, Wm. S.....	2	Indiana Wire Fence Co.....	7
Bissell, E. Son & Co.....	51	Cleveland Fence Co.....	8	Fitch, W. & E. T.....	95	Ives, H. B. & Co.....	7*
Blair Mfg. Co.....	35	Cleveland Rubber Works.....	67	Fitchburg Machine Works.....	33	Jacobus, W. H.....	88
Blake & Johnson.....	13	Cleveland Stamping & Tool Co.	74	Fitzsimons & Co.....	16	Jarecki Mfg. Co.....	39
Bliss Co., E. W.....	35	Cleveland Stone Co.....	43	Flagg, Stanley G. & Co.....	96	Jeffrey Mfg. Co.....	33
Boardman, L. & Son.....	65	Cleveland Twist Drill Co.....	42	Folding Paper Box Co.....	60	Jenkins Bros.....	1
Boker, Hermann & Co.	17	Clinton Wire Cloth Co.....	8	Foos Mfg. Co.....	34	Jenkins & Lingle.....	36
Bommer Bros.....	76	Cobb & Drew.....	6	Fraim, E. T.....	76	Jenner, H. W. T.....	6
Bond Nail Co.....	13	Coburn Trolley Track Mfg. Co.	75	Frankford Steel Co.....	18	Jessop, Wm. & Sons.....	17
Boone, W. C. Mfg. Co.....	23	Coes, Loring & Co.....	83	Franklin, H. H. Mfg. Co.....	49	Johnson, I. H., Jr., & Co.....	44
Booth, The Lloyd Co.....	24	Coes Wrench Co.....	83	Frost Thill Spring Co.....	81	Johnson, S. O.....	72
Borden & Lovell.....	8	Coffin & Leighton.....	39	Fulton Iron & Engine Works.....	44	Jones, B. M. & Co.....	19
Borgner, Cyrus.....	24	Colburn, A. M.....	40	Gardner, Jas. & Son.....	24	Jones, M. D. & Co.....	74
Boston Gear Works.....	27	Colby Wringer Co.....	73	Garrison, A., Foundry Co.....	25	Jones & Lamson Machine Co.	54
Bourke Mfg. Co.....	58	Coldwell Lawn Mower Co.....	83	Garry Iron & Steel Rfg. Co.....	10	Jones, Jesse & Co.....	60
Box, Alfred & Co.....	43	Conroy, P. J. & Co.....	81	Gartland Foundry Co.....	21	Kanneberg Roofing Co.....	14
Boyce Rivet Co.....	96	Continental Iron Works.....	27	Garvin Machine Co.....	43	Kay, J. F.....	4
Bradlee & Co.....	15	Corning, Edw. & Co.....	15	Gautier Steel Department.....	14	Kayser, Ellison & Co.....	17
Bradley Fertilizer Co.....	46	Cotton, Barclay W. & Co.....	15	Gaylor, F. L. Co.....	3	Keeley, Jerome & Co.....	16
Brass Goods Mfg. Co.....	2	Covert Mfg. Co.....	81	Gibbs Mfg. Co.....	86	Kelley & McBean.....	71
Bridgeport Gun Implement Co.	42	Covert's Saddlery Works.....	55	Gildart & Bennett Mfg. Co.....	8	Kennedy, Julian.....	25
Bridgeport Mch. Tool Works.....	47	Cox, Justice, Jr.....	16	Glazier Stove Co.....	55	Keuffel & Esser Co.....	59
Briggs, Marvin.....	49	Cramp, Wm. & Sons S. & E. B. Co.	3	Goddard, Asa.....	44	Keys, W. W. & R. M. Co.	3
Bristol Co.....	1	Crawford Mfg. Co.....	71	Goodell Co.....	66	Keystone Clutch & Machine Works..	40
Britton, Horace E.....	56	Crescent Horse Shoe & Iron Co.	31	Goubert Mfg. Co.....	31	Kilbourne & Jacobs Mfg. Co.	84
Britton, J. Blodgett.....	26	Crescent Phosphorized Metal Co.	3	Gould & Eberhardt.....	33	Kilmer Mfg. Co.	7
Broderick & Bascom Rope Co.....	6	Crescent Steel Co.....	18	Gould & Andrews.....	46	King, J. M. & Co.	63
Bromwell Brush & Wire Goods Co. 18&57						Kohler, F. E. & Co.	85

Kreischer, B. & Sons.....	24	New Haven Copper Co.....	2	Richards, I. P.	95	Supplee Hardware Co.....	86
Krogsrud, W.....	60	New Haven Mfg Co	37	Ridgway, Craig & Son.....	44	Sweetser, W. A.....	21
La Belle Steel Co.....	20	New Haven Wire Mfg. Co.....	6	Riehlé Bro Testing Machine Co.....	35	Swindell, W. & Bros.....	25
Lafin & Rand Powder Co.....	22	N. J. Wire Cloth Co.....	8	Ripley Mfg. Co.....	78	Taintor Mfg. Co.....	60
Lake, J. H. & D. Co.....	40	New Process Twist Drill Co.....	42	Riverside Iron Works.....	19	Tablet & Ticket Co.....	46
Lane Brothers.....	76	Newton & Shipman.....	17	Roberts, A. & P. & Co.....	18	Talcott, W. O.....	88
Laughlin, Alex & Co.....	25	N. Y. Belting & Packing Co.....	34	Roberts Mfg. Co.....	39	Taunton Locomotive Mfg. Co.....	30
Lea, J. Tatnall & Co.....	20	N. Y. Gas Saving Co.....	56	Robertson, E. C.....	51	Taunton Wire Nail Co.....	7
Lean, D. R. Co.....	26	N. Y. Mallet & Handle Works.....	59	Robinson-Rea Mfg. Co.....	23	Thomson, W. H. & Co.....	16
League Cycle Co.....	95	N. Y. Powder Co.....	22	Rogers, The Wm. Mfg. Co.....	36	Tiebout, W. & J.....	77
Le Count, C. W.....	81	N. Y. Iron Roofing & Corrugating Co.....	10	Rollason Gas Engines.....	29	Tilghman's Pat. Sand Blast Co., Ltd.....	25
Leechburg Foundry & Machine Co.....	22	Nicholson File Co.....	63	Rome Brass & Copper Co.....	2	Titchener, E. H. & Co.....	7
Leng's, Jno. S. Son & Co.....	96	Nicolls, Wheeler & Co.....	15	Rowland, Wm. & Harvey.....	96	Tod, Wm. & Co.....	27
Leonard, B. E.....	83	Niles Tool Works.....	50	Russell, Burdall & Ward.....	96	Toledo Metal Wheel Co.....	70
Leonard, J.....	21	North Bros. Mfg Co	18 & 55	Russia Cement Co.....	57	Toomey, Frank.....	49
Leschen, A. & Sons Rope Co.....	6	Northampton Cutlery Co.....	66	St. Louis Bronze & Aluminum Works	3	Topliff & Ely Co.....	88
Levis, Henry & Co.....	21	Northampton Emery Wheel Co.....	43	Sabin Machine Co.....	5	Torrey, J. R. Razor Co.....	65
Lidgerwood Mfg. Co.....	96	Norton Bros.....	77	Salem Wire Nail Co.....	18	Totten & Hogg Iron and Steel Fdry. Co.....	27
Lindsay, Jas. G. & Co.....	16	Norton Emery Wheel Co.....	43	Samson Cordage Works.....	1	Townsend, W. F. & Co.....	88
Link-Belt Engineering Co.....	38	Norton & Jones Machine Tool Works.	40	Samuel, Frank.....	15	Trenton Iron Co.....	4
Lockhart Iron & Steel Co.....	20	Norwalk Iron Works Co.....	32	Saunders' Sons, D.....	38	Trettheway Mfg. Co.....	25
Lovell, Jno. P. Arms Co.....	70	Nubian Iron Enamel Co.....	46	Sawyer, O. C.....	67	Trimont Mfg. Co.....	82
Lovegrove & Co.....	49	Oakes & Irwin.....	84	Scattergood, H. W.....	53	Tyler Wire Works Co. W. S.....	54
Loyd, John.....	63	Obermayer, S. Co.....	21	Scheeler & Sons.....	5	Union Mfg. Co.....	41
Ludlow-Saylor Wire Co.....	7	Ogden & Wallace.....	21	Schneider & Trenkamp Co.....	84	Union Metallic Cartridge Co.....	1
Lufkin Rule Co.....	58	Old Dominion Iron & Nail Works Co.	79	Schultze Mfg. Co.....	74	U. S. Projectile Co.....	38
Lukens Iron & Steel Co.....	15	Ossawan Mills Co.....	95	Scott, Geo. M.....	33	Valentine, M. D. & Bro.....	24
Lundberg, Gustaf.....	17	Ostrander Fire Brick Co.....	24	Scoville Mfg. Co.....	2	Valley Pump Works.....	32
Lunkenthaler Co.....	28	Ostrander, W. R. & Co.....	59	Scranton & Co.....	36	Valley Steel Co.....	1
McCabe, J. J.....	48	Otto Gas Engine Works.....	30	Scranton Forging Co.....	79	Van Dorn Iron Works Co.....	7
McCaffrey File Co	63	Packer, C. W.....	55	Scranton Supply & Machine Co.....	48	Van Wagoner & Williams Hdw. Co.	96
McClure & Amsler.....	26	Palmers & De Mooy.....	23	Seaman, Sleeth & Black.....	23	Victor Mfg. Co.....	77
McCoy, Jos. F. & Co.....	37	Palmer Hardware Mfg. Co.....	56	Sebastian Lathe Co.....	44	Vulcan Iron Works.....	28
McFarland, Wm.....	4	Pancoast Henry B. & Co.....	39	Sellers, Wm. & Co.....	45	Walbridge & Co.....	68
McGowan, J. H. & Co.....	32 & 33	Passaic Rolling Mill Co.....	21	Seneca Falls Mfg. Co.....	44 & 60	Wallace Wm. H. & Co.....	21
McIlvain, Wm. & Sons.....	26	Peabody & Parks.....	73	Sessions Foundry Co.....	23	Walworth Mfg. Co.....	95
McKay, Jas. & Co.....	16	Peck, A. G. & Co.....	96	Seyfert's Sons, L. F.....	48	Wardlow, S. & C.....	17
McKinney Mfg. Co.....	75	Pennsylvania Bolt & Nut Co.....	87	Shipley, A. B. & Son.....	65	Washburn & Moen Mfg. Co.....	4
McKinnon Dash & Hdw. Co.....	84	Penna. Diamond Drill & Mfg. Co.....	22	Shoenberger & Co.....	78	Waterbury Brass Co.....	2
McLean, John.....	27	Pennsylvania Mch. Co.....	48	Shultz Belting Co.....	1	Waterbury Farrel Foundry & Machine Co.....	32
McLeod & Henry Co.....	24	Perry, W. H. & Co.....	48	Sickels, Sweet & Lyon.....	64	Waterbury Machine Co.....	41
McNab & Harlin Mfg. Co.....	27	Perry & Whipple Co.....	77	Sidney Steel Scraper Co.....	85	Watson & Stillman.....	38
Machinists' Supply Co.....	49	Philadelphia Drop Forge Co.....	22	Sigourney Tool Co.....	39	Webster, Warren & Co.....	28
Mackey, James T.....	2	Philadelphia Engineering Wks.....	26	"Silver Finish".....	14	Wellman Iron & Steel Co.....	15
Mahoning Valley Iron Co.....	21	Philadelphia Lawn Mower Co.....	87	Silver Mfg. Co.....	46	Wells Bros. & Co.....	41
Main Belting Co.....	34	Phillips, A. J. & Co....64, 65, 67, 68, 74 & 75		Simonds Mfg. Co.....	60	Wetherell Bros.....	17 & 20
Manning, Maxwell & Moore.....	42	Phillips, Townsend & Co.....	13	Singer, Nimick & Co.....	20	Wetherhill, Robt. & Co.....	95
Manville Machine Co., E. J.....	47	Phoenix Horseshoe Co.....	79	Smith & Egge Mfg. Co.....	43	Wharton, J. S. Lovering	57
Mansfield, H. H.....	49	Phoenix Iron Co.....	15	Smith, H. D. & Co.....	81	White, A. A. & Co.....	60
Maris & Beekley.....	45	Phosphor Bronze Smelting Co.....	3	Smith, J. D. Foundry Supply Co.....	23	White, L. & I. J. Co.....	65
Maslin, J. & Son	32	Pierson & Co.....	18	Smythe, S. R. Co., Inc.....	25	White Mt. Freezer Co.....	55
Mast, Foos & Co.....	57	Pike Mfg. Co.....	64	Solomon, Jno. M.....	23	White, Van Gish & Co.....	64
Matthiessen & Hegeler Zinc Co.....	2	Pilling & Crane.....	16	Sommer's Son, John.....	96	Whitlock Coil Pipe Co.....	30
Maurer, H. & Son	24	Pittsburgh I. & S. Eng. Co.....	26	Southwark Foundry & Machine Co.	28	Whitney, A. R. & Co.....	18
Mayhew, H. H. Co	66	Pittsburgh Mfg. Co	93	Specialty Mfg. Co.....	68	Whiton, D. E. Mch. Co.....	40
Merrill Bros.....	28	Pittsburgh Reduction Co.....	54	Speldei, J. G.....	45	Wickes Bros.....	50
Merrill Mfg. Co.....	38	Place, Geo.....	48	Spencer's I. S. Sons.....	24	Wickwire Bros.....	7
Miles, F. S.....	10	Plumb, Fayette R.....	67	Standard Fdry. & Mfg. Co.....	21	Wilcox & Howe Co.....	77
Miller & Van Winkle.....	4	Plume & Atwood Mfg. Co.....	2	Standard Horse Shoe Co.....	79	Wiley & Russell Mfg. Co.....	39 & 96
Millers Falls Co.....	56 & 9 ⁶	Pollock, W. B. & Co.....	27	Standard Lighting Co.....	69	Williams, J. H. & Co.....	82
Milne, A. & Co.....	18	Poole, Robt. & Son Co.....	31	Standard Tool Co.....	42	Wilkinson, A. J. & Co.....	59
Milton Mfg. Co.....	87	Pope Mfg. Co.....	55	Stanley Rule & Level Co.....	95	Williamson, C. T. Wire Nov. Co.....	95
Milner & Peck Mfg. Co.....	37	Popping, J.....	53	Stanley Works.....	76	Williamsport Wire Rope Co.....	6
Missouri Metal Co.....	2	Port Chester Bolt & Nut Co.....	87	Star Mfg. Co.....	83	Wilmot & Hobbs Mfg. Co.....	1 & 96
Mohr, J. J.....	16	Portland Lawn Sprinkler Co	85	Stark Mch. & Tool Co.....	36	Wilson, E. H. & Co.....	18
Monarch Cycle Co.....	71	Pottstown Iron Co.....	18	Starrett, L. S.....	59	Wilson, John.....	64
Monce, S. G.....	74	Pottsville Iron & Steel Co.....	15	Steam Gauge & Lantern Co.....	73	Wilson, J. Fred.....	88
Montour Iron & Steel Co.....	21	Powell Planer Co.....	46	Stearns, E. C. & Co.....	54 & 76	Wilson, W. A.....	37
Moore, Dr. Gideon E.....	54	Pratt & Cady Co.....	95	Stepto, J. & Co.....	49	Winslow, Sam'l, Skate Mfg. Co.....	68
Moore Mfg. & Foundry Co.....	45	Pratt & Whitney Co.....	41	Sterling Cycle Works.....	70	Wire Goods Co.....	9
Moore & White Co.....	46	Prentiss Tool & Supply Co.....	48	Sterling Emery Wheel Co.....	43	Wister, Francis.....	16
Moorhead-McCleane Co.....	20	Prentiss Vise Co.....	58	Sternbergh, J. H. & Son.....	88	Wister, L. & R. & Co.....	21
Morgan Construction Co.....	4	Pullman Sash Balance Co.....	65	Stevens Arms & Tool Co.....	62	Wohler Aluminum Co.....	75
Morgan Spring Co.....	4	Putnam Nail Co.....	80	Steward & Romaine Mfg. Co., Ltd.	87	Wolcott & West.....	53
Morrison, Robert.....	28	Quint, A. D.....	98	Stiles & Parker Press Co.....	35	Wolf, W. & L.....	35
Morse Twist Drill & Machine Co.....	42	Rainey, W. J.....	1	Stirling Co.....	30	Wolff, R. H. & Co. Ltd.....	5
Morse, Williams & Co.....	45	Rand Drill Co.....	31	Stocking, E. B.....	6	Wollensak, J. F.....	58, 60 & 77
Morton, Thos.....	82	Randolph & Clowes	1	Stokes Mfg. Co.....	70	Wood Alan & Co.....	16
Moseley Iron Bridge & Roof Co.....	10	Reading Hardware Co.....	75	Storm Mfg. Co.....	58	Wood, R. D. & Co.....	23
Mount Carmel Bolt Co.....	95	Reed, Wm. & Sons.....	95	Stover Mfg. Co.....	76	Wood, W. Dewees Co.....	20
Myers, F. E. & Bro.....	58	Reece, Edw. F.....	40	Stow Flexible Shaft Co.....	42	Worcester Mch. Screw Co.....	88
National Horse Nail Co.....	81	Reeves, Paul S.....	98	Stow Mfg. Co.....	42	Worthington, Henry R.....	32
National Pipe Bending Co.....	30	Remington Arms Co.....	71	Stuart & Peterson Co.....	68	Wright & Colton Wire Cloth Co.....	8
National Saw Co.....	60	Reynolds & Co.....	10	Sturtevant, B. F. Co.....	37	Wurster, F. W. & Co.....	96
National Wringer Co	73	R.I. Perkins Horse Shoe Co.....	79	Sturtevant Mill Co.....	49	Wyman & Gordon.....	82
Newark Machine Tool Works.....	54	Rhodes, L. E. Co.....	53	Superior Steel Co.....	5	Yale & Towne Mfg. Co.....	44 & 57
New Castle Wire Nail Co.....	13	Richardson, C. F. & Son.....	60				

WHEN IN NEED Address MOUNT CARMEL BOLT CO.,
MOUNT CARMEL, CONN.



DIRECTIONS FOR USING

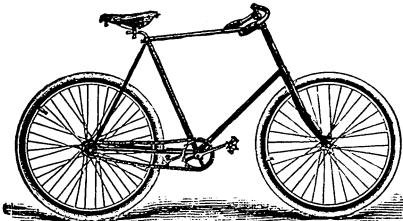
WILLIAMSON'S NEW POWER CORK SCREWS.
KEEP ON TURNING, DO NOT PULL.

No. 1243, Nickel Plated, Apple Wood Handle, \$5.00 per dozen
" 1443, " Rosewood 5.50

For Discounts and Prices of other styles send for Catalogue.

C. T. WILLIAMSON WIRE NOVELTY CO., NEWARK, N. J.
Manufacturers of Wire Specialties for the Trade.

OUR AGENTS MAKE MONEY.



We Make
Wheels to Sell and
Stay Sold.

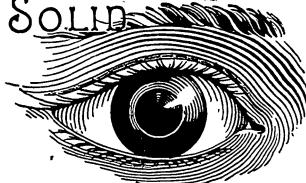
FIRST AND ONLY
IN THE WORLD TO MAKE

THE EAGLE BICYCLE MFG. CO.,
TORRINGTON, CONN.

ALUMINUM RIMS AND CLINCHER TIRES.

SOLID

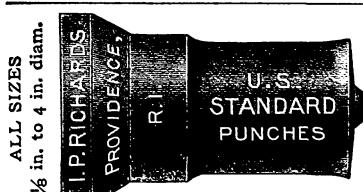
THE PRATT & CADY CO.,
HARTFORD, CONN.



Sash Weights.

WILLIAM A. HARRIS, Selling Agent.

The "DODD'S" LIQUID
GLUE.
It gives Perfect Satisfaction.
Best. A. W. DODD & CO., Gloucester, Mass.

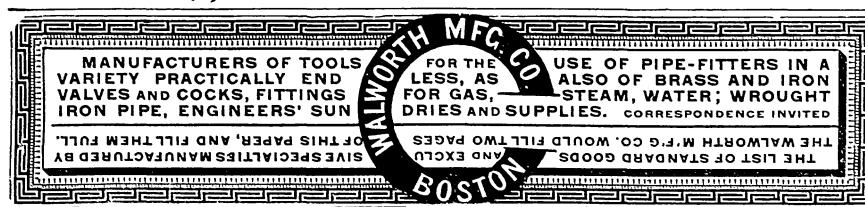


For Punching
IRON AND STEEL.

Mechanics.—The Technical Student's Introduction to. Being a series of Practical Papers showing the leading Principles of Physical Science, Exemplified in the Properties of Bodies or Materials; the laws which Regulate the Phenomena of Motion, of Heat, of the Atmosphere, of Water at Rest and in Motion, etc., etc., as applied to the Practical Work of the Architect and Builder, the Engineer and Machinist, and the General Artisan engaged in the Designing and Construction of Machines, Tools, and Appliances Useful in the Industrial Arts. By Various Writers. Edited by Robert Scott Burn. About 150 illustrations, \$2.00
for sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and bookseller, 96-102 Reade St., New York

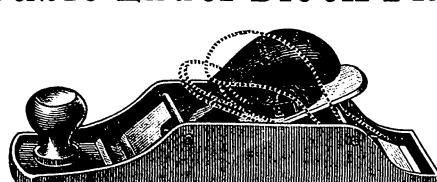


IMPROVED
Labor-Saving
CARPENTERS'
TOOLS.

STANLEY
RULE & LEVEL CO.
New Britain, Conn.

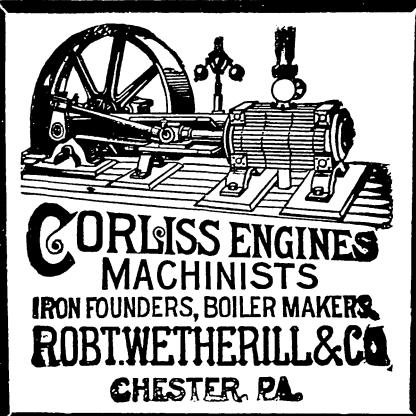
SOLD BY ALL
Hardware Dealers.

Double-Ender Block Plane



This Plane has two slots, and two cutter seats. It can be used as a Block Plane; or, by reversing the position of the cutter and the clamping wedge (see dotted lines in the engraving), it can be used to plane close up into corners, or places difficult to reach with any other plane.

No. 180. Block Plane (Double-Ender), 1½ inch Cutter, \$0.80



CORLISS ENGINES
MACHINISTS
IRON FOUNDERS, BOILER MAKERS,
ROBT WETHERILL & CO.
CHESTER, PA.

Look ! Look !!
1894 MODEL BICYCLES
FOR HARDWARE TRADE.



NEW MAIL.

New 1894 Model NEW MAIL. Highest Grade, 10 years' reputation. Also BEST LINE cheap and medium grade wheels in the market. Address

WM. READ & SONS,
107 WASHINGTON ST., - BOSTON.
ESTABLISHED 1826.

MUST SECURE AGENCY NOW !!!



CROWN and GIANT BRAIDED
Sash Cords, Bell Cords, Mason's Lines, Clothes Lines, Bright Wire Goods, Picture Wire Nails, Knobs and Hooks, Brass Chain, Spool Wire, Etc.

OSSAWAMILLS CO.,
Norwich, Conn., U. S. A.



SECURE AGENCY NOW.
The League Chainless Safety
MARKS A NEW ERA.



SEND FOR CATALOGUE.—
THE LEAGUE CYCLE COMPANY,
Hartford, Ct.

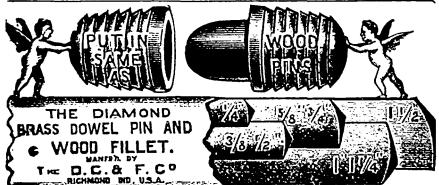


This Cut represents the UNION PAUL BOLT SNAP.

PAUL S. REEVES,
Philadelphia.
Phosphor Bronze
AND
BABBITT METALS.

Lead Lined Car Bearings a Specialty.

Brass and Phosphor Bronze Castings from $\frac{1}{4}$ pound to 20,000 pounds in weight.



DAYTON
MALLEABLE
IRON CO.
DAYTON, O.
HIGH CLASS
CASTINGS A SPECIALTY.

EXPERIMENTAL ELECTRICITY.
By EDWARD TREVERT.

Illustrated. - Cloth. - \$1.00.

CONTENTS—Some Easy Experiments in Electricity and Magnetism; How to Make Electric Batteries; A Galvanometer; An Induction Coil; An Electric Bell; A Magneto Machine; A Telegraph Instrument; An Electric Motor; A Dynamo; Electric Bell Fitting and Gas Lighting; Electric Lamps; Electric Terms.

Sent postpaid on receipt of price by
DAVID WILLIAMS, Publisher & Bookseller,
96-102 Reade Street, New York.

STANLEY G. FLAGG & CO., Philadelphia, Pa.
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.
Manufacturers of **STEEL CASTINGS**,
A Substitute for Steel and Wrought Forgings.
Circulars Sent on Application.

ROLLER JACK SCREW.

See Page 56.

MILLERS FALLS CO.,
93 Reade St., New York.

EUREKA CAST STEEL COMPANY.
Office and Works, Chester, Pa.
Open Hearth, Crucible and Eureka Steel Castings.
Railroad and Machine Castings.
Locomotive Cross-Heads and Gearing a Specialty.
Guaranteed Knuckles for M. C. B. Couplers.

SPRINGS AND AXLES
ROLLING MILL.
F. W. WURSTER & CO.
375 Kent Ave. Brooklyn N.Y.

New Full Mounted Lightning Screw Plate.
Send for Catalogue

Genuine Lightening Screw Plate
A Stock with Extra Large
PERFECT SCREWS AT A SINGLE CUT

WILEY & RUSSELL MFG. CO. - Greenfield, Mass.

LIDGERWOOD
HOISTING ENGINES.

300 styles and sizes. Over 10,000 in use.

LIDGERWOOD MFG. CO. 96 Liberty St., N. Y.

ESTABLISHED
Spring Making, 1842. Steel Making, 1845.
Norway Iron, 1871 (Re-Rolled).

WM. & HARVEY ROWLAND,
MANUFACTURERS OF

Springs, Steel, Re-Rolled Norway
Iron & Slit Norway Nail Rods.

Address FRANKFORD P. O., PHILADELPHIA.

A. G. PECK & CO.
Cohoes, N. Y.
MANUFACTURERS OF
AXES, ADZES,
BROAD AXES,
HATCHETS.
Send for Catalogue
and Price List.

THIS IS THE TIME TO BUY
Lemon Squeezers

WRITE FOR PRICES TO
JOHN SOMMER'S SON,
355-365 Central Ave., Newark, N. J.

RUSSELL, BURDSALL & WARD,
Portchester, N. Y.,
Manufacturers of
Carriage, Tire, Plow and Stove

BOLTS

Carriage Bolts made from Best Square Iron a Specialty.

The Wilmot & Hobbs Mfg. Co.,
MAIN OFFICE, MILLS AND FACTORIES AT
BRIDGEPORT, CONN.
STORE, 20 MURRAY ST., NEW YORK.
(CONNECTED BY TELEPHONE.)



Annual Capacity 15,000 tons.
Annual Capacity 30,000 tons.

BESSEMER, OPEN HEARTH,
and the Celebrated and Unequaled
"SWEDOH"
(REGISTERED TRADE-MARK.)

Sheet, Band and Strip Steel.

HOT ROLLED in lots of a few tons or more of a size, and in widths varying from one inch to eight inches or thereabouts by about 1-16 inch and in thickness No. 21 Stubb's Gauge (about 1-32 inch) and thicker for the narrower widths and proportionally thin for the wider sizes, and with plain blue, annealed or pickled finishes.

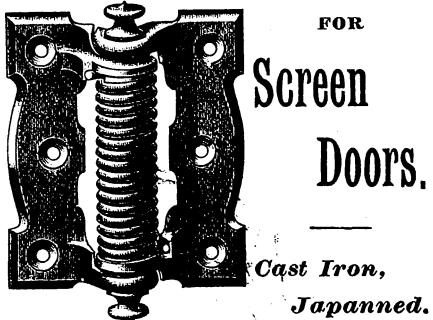
COLD ROLLED Especially to order in lots of a ton or more of a size, with round edges in any of the regular Hot Rolled Steel stock widths up to 15 inches (other widths furnished at our option with round edges or one or two sheared edges; unless ordered differently) and in thickness No. 23 Stubb's Gauge (less than 1-100 inch) and thicker, depending upon the width, up to about No. 6 Stubb's Gauge (about 2-10 inch) and with any quality of surface or degree of stiffness or ductility, as follows:

Tabulated Code of Initials used in describing degree of Smoothness of Surface and Ductility of Cold Rolled Steel.

	"EXTRA SOFT BRIGHT DRAWING STEEL."	"SOFT" BRIGHT DRAWING STEEL."	"HALF HARD" BRIGHT BENDING STEEL."	"HARD" BRIGHT BENDING STEEL."	"EXTRA HARD" BRIGHT STEEL."
"Fairly Smooth" Surface.	A. F.	B. F.	C. F.	D. F.	NONE MADE.
"Good Smooth" Surface.	A. G.	B. G.	C. G.	D. G.	E. G.
"Best Smooth" Surface.	A. B.	B. B.	C. B.	D. B.	E. B.

Used for all Pressed, Stamped and Drawn Work. Easily Brass, Copper, Bronze or Nickel Plated, Tinned or Japanned.

Columbia Spring Hinges



FOR
Screen
Doors.

Cast Iron,
Japanned.

These Hinges are very simple in construction. They are packed flat, with the tension of the Springs adjusted, and are "ready for business" as soon as attached to the door.

Having no small or loose parts, they cannot get out of order.

They are reversible and can be used on either Right or Left Hand Doors.

No. 14, 3 x 2 $\frac{1}{2}$, Japanned.
1 Dozen pairs in a box. $\frac{1}{2}$ Gross pairs in a case.
THE CHEAPEST AND BEST SPRINGS IN THE MARKET. SEND FOR PRICES.

MANUFACTURED BY
VAN WAGONER & WILLIAMS HDW. CO.,
Cleveland, Ohio, and 14 Warren Street, New York.

THE IRON AGE

THURSDAY, APRIL 26, 1894.

The Barr Compound Non-condensing Pumping Engines.

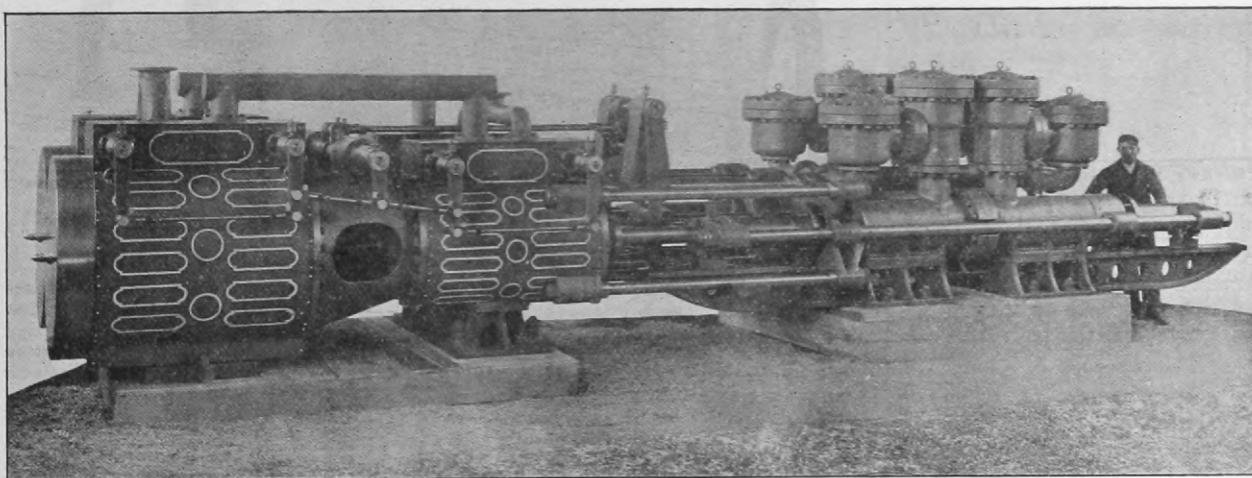
The Barr Pumping Engine Company of Philadelphia have recently designed and erected for the new Bessemer steel plant of the Ohio Steel Company, at Youngstown, Ohio, three compound non condensing pressure pumping engines, for serving the hydraulic machinery of the plant, the general features of which are shown in the accompanying illustrations. These pumping engines are of special design, adopted after careful consideration of the conditions of service under which they are to be operated and are of an exceptionally high grade class of machinery.

There is probably no more severe service to which pumping machinery

steel plants that, while no effort has been spared to introduce in other features machinery of the highest class, the question of economy in the pumping plant, not the smallest feature of the whole by any means, has been disregarded. Anything seems to be considered good enough.

In the subject of the present article great care has been given to an elaboration of detail by which the greatest economy of operation for this class of pumping engine may be obtained while conserving the merits of the simple and strong type of construction. The engines described are three in number, and have a maximum capacity of 400,000 gallons of water delivered per hour, under a pressure of 1000 pounds per square inch. The high pressure cylinders are 24 inches in diameter, the low pressure cylinders 40 inches in diam-

eter chamber to the exhaust chest. The steam contained in the cylinder back of the exhaust port is exhausted more or less slowly through the cushion ports, thus forming a cushion at the end of the stroke. The connection between the valve and valve gear is through a gun metal stem provided with a tee head. The bonnet and stuffing boxes are of the Corliss type. The steam piston rods are made of hammered crucible steel, and are continuous between the cross head and low pressure piston. They are $5\frac{1}{4}$ inches in diameter between the cross head and the high pressure piston, and between the high and low pressure pistons they are $4\frac{1}{4}$ inches in diameter. They are connected to the pistons and cross heads with straight fits, the shoulders being reinforced with steel collars. They are secured to the cross heads by forged steel keys and to the pistons by



THE BARR COMPOUND NON-CONDENSING PUMPING ENGINES.

can be put than in the ordinary demands of steel works, where at one moment the full maximum capacity of the plant may be demanded, and almost instantaneously the stoppage of the various motors brings the pumping machinery to a sudden standstill. Added to this is the possibility of an accident, which may occasion to the parts subjected to water pressure a blow equal in force to many times the strains which have to be provided for under the normal conditions of service. It therefore becomes the duty of the designer of this class of machinery to build such an engine as is, in the first place, essentially strong in all its parts and with a large factor of safety for strength, and which, in the second place, possesses the greatest durability of the working parts. The difficulties resulting from a breakdown of a pumping plant in a steel works are too serious to be disregarded; simplicity of construction and durability of parts is, therefore, a feature of considerable moment. In the great majority of instances, however, economy of practice has been sacrificed to the desire on the part of the designer to simplify and cheapen construction. The average pressure pumping engine is not a work of engineering skill, and we see in many of our comparatively modern

engines. They are arranged in tandem pairs, with the low pressure cylinders outside. They are made of a special and carefully selected mixture of charcoal irons of close texture and high tensile strength, and are of sufficient thickness for reboring. The high pressure cylinder is fitted with two cushion valves in each end, the low pressure cylinders with one in each end. The office of these valves is to permit the passage of steam from the steam to the exhaust ports at the end of the exhaust stroke, and by their regulation the amount of steam cushion or exhaust release at the end of the stroke may be varied to suit the working conditions. The steam pistons are fitted with followers and metallic packing rings of segmental form. These packing rings are set out with elliptical springs and require no adjustment to keep them tight. The pistons are provided with set screws and pads on the bottom for keeping them central with the cylinders and to compensate for wear on the junk ring. The steam valves are of the rotary type, one in each end of each cylinder, the cylinder being double ported, as shown in the sectional engraving. Steam is admitted to the cylinder through the outside port direct and exhausted through the inside port and

forged steel nuts. All the steam stuffing boxes and glands have bushings of United States gun metal, and all the joints of the steam end are made with soft copper gaskets. The steam cylinders are neatly lagged with a paneled lagging of cast iron secured to the flanges of the cylinders with screws. Between this lagging and the cylinder and chest walls the space is filled with magnesia to prevent radiation.

The intermediate pieces between the high and low pressure cylinders form the inside heads for the cylinders, and carry the stuffing boxes for the piston rod. They are of conical form, as shown, with suitable provision for convenient access to the stuffing boxes, and are strongly ribbed and braced. The outside low pressure cylinder head is of ribbed form, and is covered with a polished cast iron cap, secured with acorn nuts. The inside heads of the high pressure cylinders are turned and polished, and carry the stuffing boxes for the piston rods. The high pressure cylinders are bolted to the foundation on heavy cast iron feet, to which they are secured. The low pressure cylinders simply rest upon a foot of cast iron, which is bolted to the foundation. By this means provision is made for the expansion and contraction of the inter-

mediate parts. The steam and exhaust chests of both high and low pressure cylinders are cast with the cylinders. The steam pipe is of Y form, connecting the high pressure chests with the throttle valve. The connecting pipes between the high and low pressure cylinders are of cast iron.

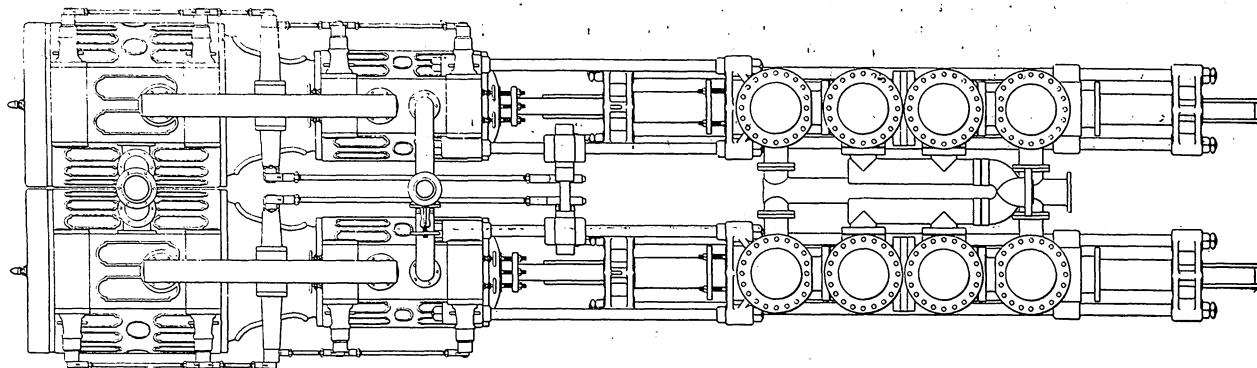
The valve gear is of the standard duplex form of the Barr Pumping Engine Company. All the pins of this gear are of hardened steel. The stubs of the valve rods are fitted with half boxes for taking up the wear and are made of United States gun metal. The valve connecting rods are of steel, and ample provision for convenient adjustment of the length of the valve rods is made. The valves of each pair of cylinders are operated through the medium of an intermediate rock shaft, which receives

weight of the plungers, through the medium of gun metal slippers provided with wedges for convenient adjustment.

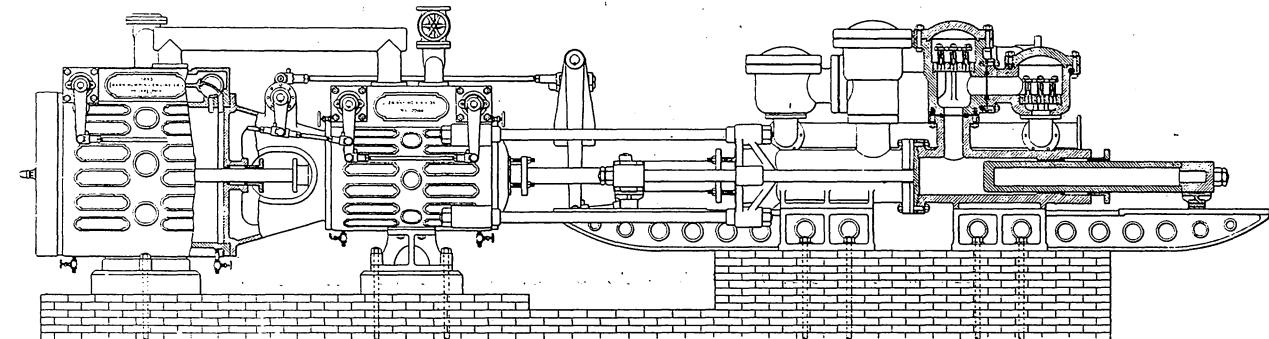
The valve chambers are made of a special mixture of charcoal irons, cast from an air furnace. Each pump is furnished with four suction and four discharge chambers of pot form. The valve plates are of solid United States gun metal secured within the chambers with brass studs and nuts. Each chamber contains seven $2\frac{1}{4}$ inch valves of special design, also made of gun metal. All the joints of the water end, with the valve seats, are of the ring flange pattern, and the bolting is most liberal. Twenty-two 2-inch foundation bolts secure each engine to its foundation. The total weight of each engine is 90,000 pounds. The finish of the en-

been out of blast for about three years, but was started early in April. It is cold blast, and the product is about 14 tons per day, but it is expected that this will be increased to 16 or 17 tons. The sole selling agency has been placed in the hands of Rogers, Brown & Co. and their branch houses. The iron is held at a figure above the price of ordinary car wheel brands, but no higher than the best cold blast charcoal.

The annual meeting of the Iron and Steel Institute will be held in London on May 2 and 3. The following papers will be read and discussed: "On the Physical Influence of Certain Elements Upon Iron," by A. O. Arnold; "On the Analysis of Steel," by H. K. Bamberg; "On the Capacity and Form of Blast Furnaces," by William Hawdon;



Plan.



Sectional Side Elevation.

THE BARR COMPOUND NON-CONDENSING PUMPING ENGINES.

its motion from the main rock shaft, through central valve rods.

The frame of each engine consists of eight tie bars, four on each side, which are secured to bosses, cast on the steam and water cylinders. These tie bars are $3\frac{1}{4}$ inches in diameter, and are turned and polished, with steel collars reinforcing the shoulders. The water cylinders are cast in four separate pieces for each pump and are of the best homogeneous open hearth steel castings, having a general thickness of $2\frac{1}{2}$ inches. The central heads are likewise made of steel and are fitted with double shoulder joints. The plungers are of cast iron and the plunger cross heads of cast steel. The plunger stuffing boxes and glands are bushed with United States gun metal. Parallel rods connect the inside and outside plungers and are of steel, $2\frac{1}{4}$ inches in diameter. The cylinders are carried on feet of cast iron, which are bolted to the foundation and form slides for supporting the

engines in their entirety is of the highest class, and no effort has been spared to make the entire plant the most modern in existence. The plant of the Ohio Steel Company is an entirely new one, and is constructed under designs of Julian Kennedy of Pittsburgh.

The historic Round Mountain Furnace has passed into the possession of a new company called the Round Mountain Furnace Company, with headquarters at Chattanooga. L. S. Colyar, who has been connected with iron interests in the South for many years, is president. The furnace is located at Round Mountain, in Alabama, and during the war it was run to make iron for cannon for the Confederate Government. After the war it was idle for many years, but it was put into operation and gained a reputation for use in chilled rolls and similar work requiring great strength. It has

"On Scandinavia as a Source of Iron Ore Supply," by Jeremiah Head; "On the Application of Electricity as a Motive Power in the Iron and Steel Industries," by D. Selby-Bigge; "On the Walrand Process," by G. J. Snelus; "On Methods of Preparing Surfaces of Iron and Steel Microscopic Examination," by J. E. Stead; "On the Relations Between the Chemical Constitution and Ultimate Strength of Steel," by W. R. Webster.

Witherbee, Sherman & Co. of Port Henry, N. Y., have posted notices stating that work in the firm's mines will cease on May 1.

The speedy new triple screw cruiser "Columbia" goes into commission at Philadelphia this week. She will be sent to the New York navy yard for the completion of her equipment, after which the vessel will be ready for active service.

American vs. European Basic Bessemer Steel.

BY J. B. NAU, ALLEGHENY, PA.

The question of making basic steel in this country, since the time that Southern ore and coal fields have become better known, has been discussed in a number of articles published in different trade papers of the United States. Its importance has still further increased since the patents covering the basic Bessemer process have expired and will in no way interfere with the development of this branch of industry in those parts of the country where all the raw materials can be gathered together to successfully introduce it.

Some time ago a paper, contributed by Mr. Tordeur to the *Revue Universelle des Mines*, on the manufacture of basic steel in Belgium, was taken up by and very ably discussed in *The Iron Age*. In this discussion the writer, as could be expected, carefully established the probable cost prices per ton of basic steel in this country, and established a comparison between the American and Belgian cost prices.

Nearly at the same time that Mr. Tordeur's paper was published in the *Revue Universelle des Mines*, another paper of similar importance had been presented by Mr. Palgen before the *Ingénieurs sortis de l'Ecole de Louvain*. In this paper also the author establishes with all the necessary details the cost price per ton of basic steel; but, while Mr. Tordeur makes a comparison between the cost prices that can be obtained in different coal centers in Belgium working with Luxembourg phosphoric ores and the prices obtained in some well known concerns located right in the Luxembourg and eastern French ore districts, Mr. Palgen on the contrary limits himself to the establishment of a more general cost price for Belgian works running with Luxembourg ores. But both prices are established with great care as to details and itemized costs, and while there may be some slight differences between some of the items, the general cost prices arrived at are pretty nearly the same. In his paper Mr. Palgen describes at great length two well known steel works (Hayingen and Jœuf). Both of these works are located in the same region or ore belt as Dudlingen and Longwy, and the conditions as to character and costs of raw materials as well as to costs of labor and other expenses are pretty nearly the same in the four works. All of them have the most modern improvements. They all have been built from 1879 to 1882, after the Thomas process had been successfully experimented with.

It is not my intention to subject the figures submitted by Messrs. Palgen and Tordeur to a minute examination. Nevertheless I will call the attention to such of these figures that have been especially considered in *The Iron Age* in the paper "Basic Bessemer Costs." It will suffice to say that according to my knowledge most of the figures taken from these reports are as correct as can be expected, and that the total cost prices established are very near the truth. As already stated, the conditions at Dudlingen and Longwy are very nearly the same as those of Hayingen and Jœuf. These two last works are particularly well known to me, since it is at Hayingen that, together with Mr. Palgen, I had my first experience in 1881

in the manufacture of basic steel, and a little later on was sent from there to take charge as superintendent of the works at Jœuf, in France, that belong practically to the same company.

I will give here in few brief words some information as to the most important points regarding the labor paid and number of men employed, because some of these items have been spoken of in the article published in *The Iron Age*, already referred to. The average labor that we used to pay on our work was about equal to the figures stated in Mr. Tordeur's paper. At first this labor was paid in daily wages, but in order to stimulate the men it was decided to pay them a premium of 5 per cent. of their daily wages if a certain number of heats were obtained in 12 hours, and to increase this premium to as high as 30 per cent. of their wages if the heat reached a number at that time considered the maximum to be obtained there. After a short while, however, when some appliances had been improved, we regularly made more heats and the prices were changed to regular tonnage prices, more satisfactory to everybody. The establishment of this tonnage price was based on the fair daily wages for a man.

The number of men per shift is given in Mr. Tordeur's paper as 88. In one of the works of the Luxembourg-Lorraine district the number amounted to only 73, but the following were not included: Engineer and fireman of iron ladle locomotive and engineer at b'ower engine, firemen at boilers, oiler, men handling ingots not at casting pit, and dolomite cupola men. The list included six pig iron and coke wheelers for iron cupola. When we were running direct from the blast furnace, which mostly was the case, these men dropped out. Sometimes the cupola was partly used. It also includes all the day labor required in the converting mill, as well as masons, bricklayers on cupola and ladle, and the men employed at the dolomite grinding mills and the tar and dolomite mixers. It furthermore excludes the number of men required to unload the raw material. Two men per shift were required to haul the lime used in the converters. In order to save labor on this item, in one of the steel works the lime is unloaded from cars standing on a trestle directly into bins or large boxes below the trestle. In this manner no lime is wasted, and the lime service is done in the cheapest possible way.

The lime we used in our works came from Belgium generally. It contained on the average about 1 per cent. of silica. We at one time received it from two different Belgian firms. In the beginning we paid for it 8 francs (not quite \$1.60) a ton of 2204 pounds, f.o.b. cars at the seller's place in Belgium. Later on, however, we paid not more than \$1.40 a ton at one place and only \$1.25 at the other place. But after having added to this the freight rate, which covered a rather long distance, this lime came as high as 17.11 francs (say less than \$3.40) a ton. A still later price that we paid for this same lime was 15.45 francs (say \$3.09), f.o.b. cars at our place. The figure of \$1.60 quoted by Mr. Tordeur as being the price of 1 ton of lime at Charleroi is, therefore, undoubtedly correct. The lime was perfectly well burnt and, as already stated, mostly of excellent quality.

The dolomite used in Hayange as well as in Jœuf had in its raw state the following composition: Lime, 29.920; magnesia, 19.810; alumina, 0.880;

oxide of iron, 1.170; phosphoric acid, 0.270; silica, 1.280; sulphur, 0.027; loss by calcining, 46.600. If this composition be compared with the composition of a chemically pure dolomite as quoted in the article "Basic Bessemer Costs" in *The Iron Age* of December 21, 1893, it will be found that it constitutes a stone of remarkable purity.

The dolomitic stone was shipped over a distance of about 40 miles (a little more or less) to Hayange, where it was burnt in a cupola built for that purpose. As the manner in which this is done is undoubtedly of importance I append here a summary description of the operation. The cupola used was 22 feet high from bottom to charging door and about 5 feet 7 inches diameter, with straight cylindrical lining. From about 2 feet from the bottom to nearly 3 feet from the top this lining was made of burnt dolomite. At different heights openings were kept in the brick work through which by means of iron bars the raw dolomite was shaken in order to make it fall down, should some hanging occur. At the bottom several doors had been placed all around through which the burnt dolomite was removed. A bustle pipe placed at a certain height and provided with four tuyeres received the blast from a blower. The pressure of the blast is extremely light, as it is important that the stone should descend slowly and be completely burnt before it reaches the lower region.

When the coke used in the operation is of good quality 20 per cent. of it will do, but if of inferior quality it is advisable to add about 25 per cent. of the weight of the raw dolomite. The stone descending slowly will begin to cool after it has passed the region of the tuyeres, and by the time it reaches the bottom of the cupola it will have become cold enough to be removed by hand. With a little practice the man in charge of the cupola will soon become an expert in sorting the dead burnt stone from the insufficiently burnt part. The latter is returned to the cupola. Before being charged in the cupola the stone must be broken to the right size. The dead burnt dolomite must be used as quickly as possible. At any rate it must be stored, if such be the case, in a dry space and be shipped in a closed car. Three men are required per shift of 12 hours to run the cupola. These men are paid from 3.50 to 4 francs per day (70 cents to 80 cents). In 12 hours such a cupla can burn from 3 to 4 tons. With some precaution even 5 to 6 tons can be burnt without increasing the number of men.

In his paper Mr. Palgen itemized the price of ground dolomite per ton mixed with tar, and found that it would amount to about \$10 per ton. This may have been the price of that material at the beginning, but the writer knows that later on it was considerably lower than that. We do not propose, however, to discuss it here, as it is of lesser importance, and certainly will not change materially the general cost price of the ingot steel.

Now that we have gone over some of the figures that may have given some doubt, we shall come to the general cost price. Mr. Palgen in his paper arrives at a general cost price of \$13.61 per gross ton of 2240 pounds. Mr. Tordeur establishes prices for four different regions, and comes to the following conclusions:

Charleroi.	Liege.	Dudlange.	Longwy.
\$14.19	\$13.86	\$12.40	\$13.25

We consider here only the prices that are obtained from Mr. Tordeur's last table, based on prices for raw materials

for the year 1892. The prices of this table being on the average about \$1 lower per ton than those given in his first table based on higher price for raw material, will be more liable to enter in competition with prices obtained in this country. The average of the four prices

coke, &c., in order to find out how the raw materials of the South will compare to them.

Ores.—The appended table gives some information about the composition of the ores used in the basic steel works of that region:

Table I.

	1	2	3	4	5	6	7	8	9	10	11
Silica	8.40	11.75	5.10	6.40	5.60	6.78	17.21	16.20	10.60	4.50	12.60
Alumina	6.86	4.75	3.5	5.76	3.33	4.27	6.61	9.50	9.10	6.60	8.00
Lime	11.80	17.70	22.50	30.10	29.00	17.74	5.67	4.80	10.00	23.00	8.50
Iron	36.42	30.90	31.20	20.40	23.28	38.56	37.61	37.10	36.50	27.00	36.50
Magnesia				1.21	1.74	1.27	1.43	1.61			
Phosphoric acid	1.31	...	1.23			1.52		1.46	1.24		

of Mr. Tordeur's table is \$13.42, very nearly the same as that established by Mr. Palgen, who gives \$13.61 per ton of 2240 pounds. The lowest price is the one obtained at the works at Dudlange, and the next lowest price is the one at Longwy. Both works are located in what we may call the ore belt region of Luxembourg-Lorraine, at some 25 miles distance apart by rail. But while Dudlange is located in the Grand Duchy of Luxembourg, Longwy is located in France. Both works are working under nearly the same conditions as to raw materials and labor, Dudlange, however, having probably the advantage in regard to ore.

Charleroi and Liege are well known coal centers in Belgium. Liege especially has a favorable location on account of the river Meuse, which enables it to ship the product at once per water. Both Liege and Charleroi, if working well the basic process, will be supplied with ores from the ore belt region of Luxembourg-Lorraine, while Dudlange and Longwy, located in this region, receive a large part of their fuel from Charleroi and Liege. This is especially true for Longwy.

Since it is the aim of this paper to establish a comparison between the prices of steel from the European works mentioned and the prices of basic steel made in some of our Southern States, with the view to ascertaining how far European basic steel can compete with domestic basic steel, it is necessary that we should know how much a ton of steel from either of the four regions mentioned would cost f.o.b. steamer at the port of Antwerp. This port is the only one from which the concerns mentioned would ship their products, with probably the exception of Liege. The works of Dudlange, where the lowest price is obtained, are located at a roughly estimated distance of 170 miles from Antwerp. Longwy may be some 25 miles nearer, while Charleroi is probably not more than 55 to 60 miles by rail from the same port. Steel ingots shipped from Dudlange, after having added railroad freight, loading and unloading expenses, would cost undoubtedly in the neighborhood of \$14.20 a ton, f.o.b. steamer Antwerp, while the same product shipped either from Charleroi or Longwy will cost more than that. Liege also, though probably another route will be followed here, can be said to be in nearly the same condition. The price of \$14.20 a ton of basic steel, f.o.b. steamer Antwerp, may then be considered as a fair starting point to make this comparison.

Before speaking of the price at which basic steel can probably be made in the South, it is necessary to say something about the raw materials used in the European works mentioned, the analysis of the ores, the quality of the

The above table has been taken from a series of analyses covering nearly the whole ore belt region of the Luxembourg and partly the Lorraine basin. Compared with our American ores used in Northern furnaces they are poor, and most of the American ironmasters would consider them hardly fit to be put into a blast furnace. The phosphorus is nearly constant, as can be seen by the few analyses quoted. The analyses, as quoted in the above table, are not complete. All the ores contain a rather high percentage of water and also some sulphur. The sulphur contents are high enough to give a rather high percentage of that element to the pig iron when no special precautions are taken in the blast furnace. Sometimes as high as 0.3 per cent. of it is found in the iron made from

contents they are not fit to be used for basic Bessemer pig without admixture of some manganese ores. This was especially the case a few years ago when no cheap method had yet been invented to remove sulphur from the pig. But since the invention of the Hoerde desulphurization process so-called Thomas pig iron without manganese, or with a smaller percentage of it, can be made, from which the sulphur is removed later. The manganese ores are brought by rail to the region mostly from Nassau, Germany, or from Belgium. Average analyses of these two ores are given below:

Nassau.				
SiO ₂ .	Al ₂ O ₃ .	CaO	Fe.	Mn.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
10 to 11	2 to 3	6 to 7	30 to 31	16 to 20

Belgium.				
SiO ₂ .	Al ₂ O ₃ .	CaO	Fe.	Mn.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
30 to 31	5 to 6	.....	20 to 21	16 to 17

Generally from 5 to 8 per cent., in some cases even 10 per cent., of manganese ores are added to the burden in the blast furnace. Of course only as little as possible of this ore is added on account of its high price. For a Nassau ore containing on the average 20 per cent. of Mn, that we used mostly in our works, we paid about \$5 a ton, f.o.b. cars at the works. Five per cent. of this ore was added to the burden.

The average of iron contained in the Luxembourg-Lorraine ores may be taken as being about 33 per cent.; the yield in the blast furnace about 31 to 33 per cent. From a table in my possession the following figures are taken:

Monthly Report from One Works of that Region for Three Different Months.

Total amount of ore required.....	18,900 tons.*	18,895 tons.*	19,756 tons.*
Total amount of pig made.....	6,024 tons.	6,036 tons.	6,140 tons.
Total amount of coke.....	5,884.57 tons.	6,053.70 tons.	6,060.06 tons.
Average yield of ore in iron.....	31.87 per cent.	32 per cent.	36.08 per cent.
Average consumption of coke per ton of iron produced.....	0.97 ton.	1.003 tons.	0.987 ton.

* Metric tons of 2,204 pounds.

these ores. Most of the ores also contain manganese oxide in sufficient quantities to put 0.2 to 0.4 per cent. into the pig. On account of their high percentage of lime and other fluxing elements they can be so burdened that no additional flux is required. But in some blast furnaces of the region a small amount of calcite, generally quarried not very far from the furnace, is added to the burden. In some other regions of the same ore belt the ores carry as high as 20 to 25 per cent. of silica. They are, however, avoided in the blast furnaces as much as possible.

The above table shows a pretty fair average analysis of the ores not only from the Luxembourg region, but from Lorraine and Eastern France as well. They are mostly found in horizontal layers in the chains of hills that rise above the general level of the valleys. Three to four veins generally lie above one another, separated by several feet of rock. These veins vary in thickness from 1 foot to as high as 20 feet. In many cases the ores are taken out in open quarries. This was especially the case some 10 to 15 years ago, and is still done to day when the amount of stripping is not too expensive to remove. Mostly, however, they are taken out in drifts run right into the veins, and in many cases heavy timbering is required. In most cases they are mined at less than 40 cents a ton of 2204 pounds. At times, when prices were low, the writer remembers that they have been sold at 42 cents a ton, f.o.b. car at the mine. But on account of their sulphur

Coke.—In spite of the low yield of iron, or the poor iron ores, the consumption of coke is about equal to 1 ton of coke to 1 ton of pig iron. It must, however, be stated that the iron produced is mostly white mottled iron. When foundry iron is produced the fuel consumption is higher. When Thomas iron is made the consumption of coke is a little higher, because then a higher temperature is required in the blast furnace, in order to eliminate as much sulphur as possible. The average of the coke consumed in certain works, per ton of pig iron produced, amounted to 1.13 per cent. This would make 2260 pounds of coke per short ton of pig iron. To-day, however, it is generally less. The item of coke constitutes the greatest factor in the cost price of pig iron in those works. No coal is found in the Luxembourg ore region. All the fuel used comes from either Belgium or Germany. In one works in that district the ton of coke, several years ago, cost \$5.24, f.o.b. car at furnace. The cost price per ton of basic Bessemer at that time was \$10.02. The consumption of coke was 113 per cent. per ton of pig, and, consequently, it cost \$5.92 per ton of pig. This shows that more than one-half of the cost price of the pig is due to the fuel used in the blast furnace. The coke generally contains about 1 per cent. and sometimes even more of sulphur, while the ash amounts to about 10 per cent. In all other respects it is good blast furnace coke, of a generally even quality.

Pig Iron.—It is hardly necessary to speak much of the pig irons that are obtained from the raw materials mentioned. The analysis of the ores indicates it sufficiently. Generally the pig iron contains from 1.7 to 2 per cent., and sometimes a little more, of phosphorus.

As far as the writer knows, no attempt is made, at least in any of the works located in the ore belt, to increase the percentage of phosphorus in the pig iron beyond that naturally due to the phosphorus contents of the ore. In some of the German works, where a large amount of Luxemburg ores are converted, the phosphorus in the pig iron often reaches 2.5 per cent., and even as high as 3 per cent. This may be due, however, more to the fact that at those works puddle cinder constitutes one of the raw materials used in the burden of the blast furnace. Puddle cinder, when it is the result of a treatment of phosphorous pig iron—the class of iron that is largely used in German and Belgian puddle mills—is always rich in phosphorus. It is advantageous to German works that have to buy their ores in Luxemburg and pay a high freight to ship them to their works, to make use of the puddle cinder that may be at hand or that they can secure at a rather low price, considering the amount of iron it contains.

With the exception of the group of the de Wendel's iron works, which, if I remember well, operated at one time as many as 80 and more puddling furnaces, only a very limited number of puddling furnaces existed in the whole Luxemburg region. Consequently very little puddle cinder is to be found there. Now, since pig iron, which naturally will contain from 1.7 to 2 per cent. of phosphorus, has been found to constitute an excellent basic iron, as far as phosphorus alone is concerned, there is no reason to increase the percentage of that element by the addition of higher priced puddle cinder. Many people still believe that a basic pig iron must contain from 2½ to 3 per cent. of phosphorus in order to give good results in the converter and this solely for the reason that in some well known German basic steel works the pig iron actually contains that amount of phosphorus. It is more probable that the German metallurgical engineers, who generally know what they are about, favor a percentage of 2½ to 3 per cent. of phosphorus in the pig because in their own district such a pig iron is the result of the cheapest burden in the blast furnace. If with a pig iron containing from 0.3 to 1 per cent. of silicon it is found that very good results can be obtained in the converter when 1.7 to 2 per cent. of phosphorus enter into its composition, it is unnecessary to try to increase the phosphorus content, because then a larger amount of lime is necessary in the converter to remove it. And we may say here, "Lime is money." In the whole Luxemburg ore district, as well as in Lorraine and in Eastern France, where the same ores are found, the average composition of a basic Bessemer iron may be given as follows: Silicon, 0.3 to 1 per cent.; manganese, 1.5 to 2 per cent., and phosphorus, 1.7 to 2.3 per cent. The presence of manganese is necessary for different reasons: It is a powerful means by which the sulphur can be reduced in the blast furnace. It also helps considerably to increase the initial temperature of the bath in the converter, especially when the silicon of the iron is at its lowest limit. Though it is advisable that this element should not be lower than given above,

there are cases, however, where it is lower, as will be seen in the following table taken from *Stahl und Eisen*:

Table II.—Analyses of Basic Pig Iron.

	C.	Si.	Mn.	P.	S
Longwy	0.35	1.80		2.1 to 2.25	0.05
Angleur	1.00	1.50		2.0	0.05
Hoerde	3.60	0.58	1.87	2.75	0.08
Phoenix	2.80	0.20	1.8 to 2.3	2.0 to 2.40	0.05
Peine	3.60	0.60	2.25	2.70	0.05
Kladno	0.44	0.40		2.0	0.03

In this table the manganese content of the pig iron used at Kladno is only 0.40, but its sulphur is very low. In the Luxemburg pig iron the sulphur is naturally pretty high when only native ores are used. It would be too high at any rate to constitute only a fairly good basic iron. The sulphur, as is well known, ought to be lower than 0.1 per cent. in this class of iron. The pig irons of Table II are all much lower in sulphur.

The figures here quoted give a fair idea of the raw materials used in that district. In the Belgian districts mentioned in Mr. Tordeur's paper the same ores are used, but their price, as well as the price of pig iron made from them, is considerably higher on account of the freight on a 60 to 100 mile haul on ore. The differences in the prices of the pig iron made in the Luxemburg district and Belgian pig iron is well illustrated in Mr. Tordeur's paper. Pig iron at Dud lange is quoted at \$9.30 a metric ton, while at Charleroi it is as high as \$11.09.

(To be concluded.)

Business in Central Ohio.

There is no enthusiasm but many signs of improvement in iron trade circles of Central Ohio and adjacent districts. Some fears are entertained that the coal miners' strike will impede active operations at a time when it appears that a steady run has commenced, and much disappointment is felt on this account. Manufacturers have, however, anticipated the trouble by using every available foot of space for coal storage, and most of them will be in a position to carry on operations for a month at least whether the strike becomes a reality or not. No improvement is apparent in the bar iron trade. Many mills remain idle, and the few that are running do not make full time. Prices do not show any improvement and inquiries are not numerous. This branch of the iron business was the first to succumb during the hard times, and indications are that it will be the last to recover. Steel billets have been bought rather freely during the past two weeks by mills using only small quantities (500 to 1000 tons at a time), and the average price has been \$16, delivered, although this figure is being generally quoted f.o.b. Pittsburgh.

In sheet mills there is a much better feeling prevailing. Jobbers of the West, Northwest, and South are sending their inquiries broadcast asking for prices for summer and fall delivery, and they appear to have realized that bottom has been reached. If this is not a fact and prices do go lower they will hug the cost marks so closely that there will be no margins for contingencies, and a few breakages or stoppages will wipe out the small profits, obtainable only under the most favorable conditions. Considering the fact that jobbers are in the market and that the roofers are doing better business, there ought not to be

any further decline in sheet iron prices. The ruling figures at present are \$2.35 for iron roofing sheets, roofers' standard gauge, and \$2.40 for steel, f.o.b. Ohio mills. No. 27 stovepipe is held at \$2.25, f.o.b. mill. These prices are for delivery prior to July 1, and are for good sized orders only. Galvanized sheets for the same delivery are quoted 80 per cent. off at mill. The fact that the fine weather of the past two weeks has stimulated building operations is given as a cause for improvement in the iron and steel roofing trade. At Canton, Wheeling, Cambridge and Cleveland it is reported that inquiries are more numerous, and more sales are resulting than at any time for six months past. The demand for conductor pipe, eaves trough, and other building material made from galvanized iron is particularly good, and rolling mills appreciate this fact. The bulk of the trade in roofing and corrugated sheets is in light gauges for small consumers. Orders for heavy gauges are few and far apart. This is accounted for by decreased construction of buildings for manufacturing purposes. An order for about 30 tons of Nos. 18 and 22 corrugated for covering the buildings of the Canton Rolling Mill Company, Canton, Ohio, was placed with the Canton Steel Roofing Company; the black sheets will be made at New Philadelphia. The buildings referred to will contain sheet mills, and it is estimated that the entire product will be consumed by home concerns.

Manufacture of Tungsten.—For some time the late Paul W. Schwarz carried on the manufacture of tungsten and its alloys at Phoenixville, Pa. He has been succeeded by the American Metallurgical Works, F. Cremer & Co., Phoenixville, who have purchased the establishment. The works will continue to make fine powdered tungsten metal, 95 to 97 per cent. ferrotungsten, carrying 25 per cent., 37 or 50 per cent., the 35 per cent. being the standard alloy; tungsten slates and tungstic acid. The American Metallurgical Works announce also that in the near future they will add the manufacture of chrome metal, ferrochrome, manganese, &c. They state that much of the imported ferrotungsten is produced in the blast furnace, while that made at Phoenixville is melted in crucibles. They claim that alloys carrying less than 40 per cent. of tungsten are superior to high grade alloys or to refined metal, because finely powdered tungsten when used in making the alloy causes excessive losses, since tungsten in powder form burns away when exposed to a red heat.

Arthur Schoell, the leading spirit of the Niagara Falls Hydraulic Power & Mfg. Company, is considering a novel plan which bids fair to a large development of manufacturing enterprises in the locality. The plan contemplates the construction of a stone building 50 x 220 feet and 16 stories high. The foundations will rest at the bottom of the gorge on solid rock and the roof of the building will be nearly on a level with the top of the bank. In this building he proposes to arrange space for numerous factories, which will be furnished with power for manufacturing purposes from the most powerful Leffel turbines. He has been assured by some of the best engineers that the plan is a feasible one. There is an unlimited quantity of stone on the ground. The remainder of the structure would be of iron and steel.

The Olsen Testing Machines.

At a meeting of the American Society of Mechanical Engineers, held on the evening of April 11, a paper was read by Tinius Olsen on the Olsen automatic testing machine. We take the following extracts from the paper: Fig. 1 is a sectional front elevation and Fig. 2 an end elevation of a testing machine of 200,000 pounds capacity, and

intermediate lever F' to the beam where the pressure is balanced and recorded. In many machines the adjustment of the poise q is done by the operator turning a hand and cord, or a belt wheel placed in front of the stand L². In this machine, however, the arrangement is shown for the automatic movement of poise q , which is now used in many places. The automatic movement is accomplished by a belt driven from the hub of pulley, U, at V; this

chine. On top of the beam is seen one-half of a very large pitched screw, 4, for moving the poise; this screw is extended into the casing 3, and on the end is secured a large disk and dial, which shows to the operator the smaller and fractional readings of the stress exerted on the specimen. The dial plate, which is secured to the end of screw, 4, is made to revolve by causing contact between it and the constantly running friction pinion, thus turning the screw

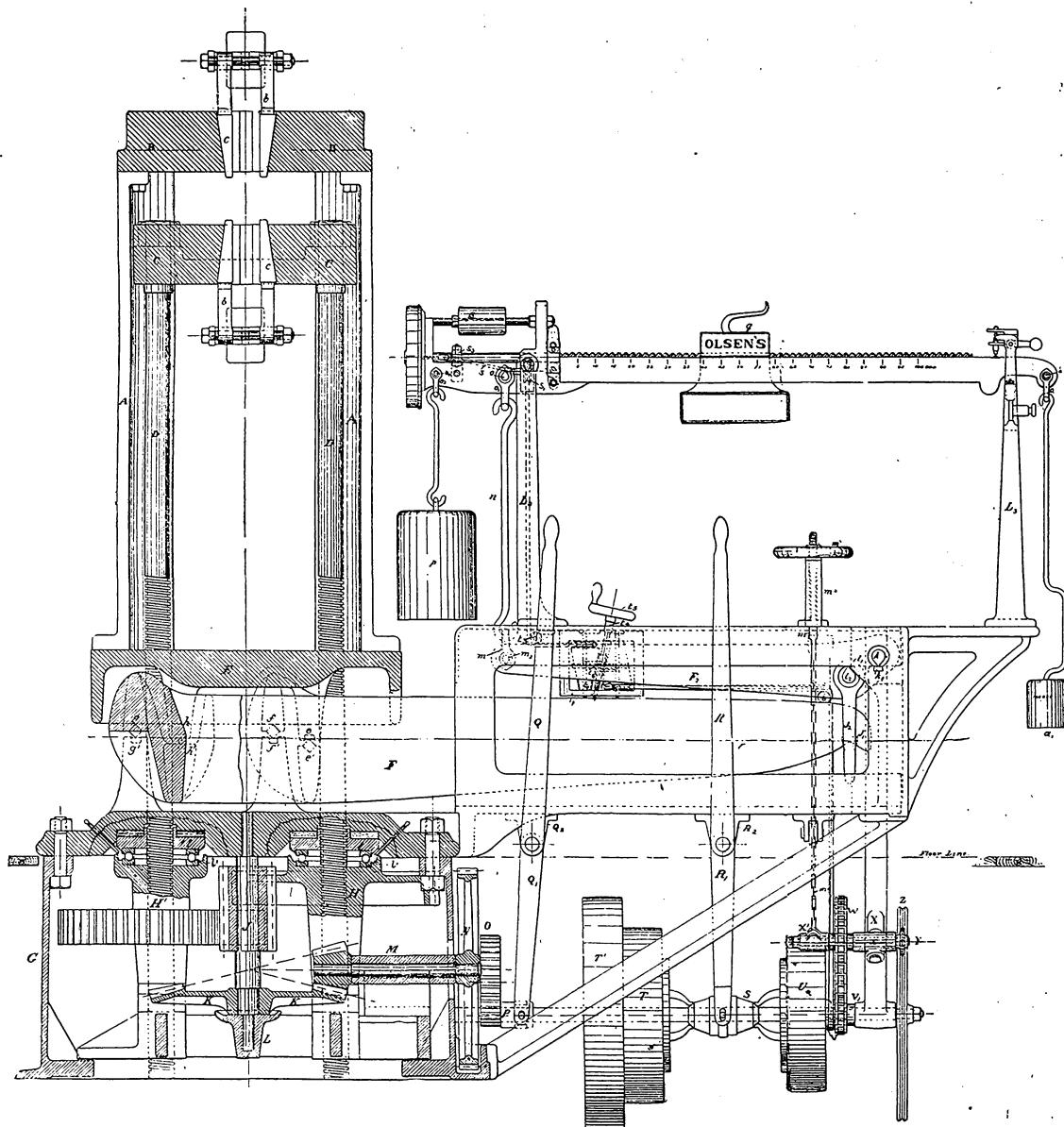


Fig. 1.—Sectional Front Elevation.

THE OLSEN TESTING MACHINES.

having an automatic device for moving the poise.

The ends of the specimen to be tested are secured in the cross heads B and C by the wedges operated and placed in the proper position by the balanced lever τ . The lower movable cross head C is secured to four screw threaded rods D, to which a vertical motion is imparted by a train of gearing in the base of the machine, and same is operated by power from the countershaft and pulleys J and U. The upper cross head B rests upon four quarter section columns, A, which are supported on the scale platform E. The platform E rests on the scale levers F' F'', which communicate the pressure exerted on the platform E through the

belt runs vertical to and over guide pulleys, Q, then horizontally to the speed regulating cones t' and t''; from cone t' a small round belt transmits the motion over guide pulleys t'' vertically to the pulley S', which turns a shaft in a bracket secured to the beam, the grooved pulley S being so placed that the belt pulls exactly in line with the balancing pivot of the beam, and thus no irregularity in the tension of the belt during the test has any effect whatever on the sensitiveness or operation of the beam. From the pulley and its shaft S the motion is further transmitted to a small friction pinion in the dial casing 3; this friction pinion is in constant motion during the operation of the ma-

chine. On top of the beam is seen one-half of a very large pitched screw, 4, for moving the poise; this screw is extended into the casing 3, and on the end is secured a large disk and dial, which shows to the operator the smaller and fractional readings of the stress exerted on the specimen. The dial plate, which is secured to the end of screw, 4, is made to revolve by causing contact between it and the constantly running friction pinion, thus turning the screw

4, which moves the poise q on the beam. This contact is effected by a lever, one end of which is the bearing for the friction pinion shaft, the other carrying an armature for an electromagnet at 5, the vibration of the beam making or breaking the current at 6 for the electro-magnet. When the beam raises, due to additional load, the contact is made, armature attracted, pinion put into gear and the poise q moved forward until the beam descends and the contact is broken; at the same time the contact between the friction pinion and the dial plate breaks.

Thus far, then, we have the machine for recording the amount of stress at which a specimen breaks. There

are, however, other points of information about the material tested which are of just as much or even greater importance for the engineer to know, such as the yielding point, and the elongation or the change of dimension of the sample tested. This data, especially the point at which yielding commences, is and has been obtainable in a very crude and unsatisfactory way, and in a great measure has been left entirely to the discretion of the opera-

rator, there having been no means for its correct determination for practical use. The drop of the beam, which is used, and is very marked for many soft iron and steel specimens, is for others not so marked, for still other grades and compositions of materials utterly untrustworthy. To make the machine indicate clearly and unmistakably this point or these points has been my object for many years. About half a dozen different systems for this purpose have been more or less completed, but laid aside, not because each system would not work or could not be made to work, and thus in a great measure accomplish the object in view; but mainly because they became too com-

plicated or were too liable to get out of order, or took too much time in their application to be of any practical value. From each attempt, however, some valuable points were gained which finally suggested and helped to develop not only the best but the least complicated of them all, and this device seems to be practically all that can be desired for the purpose. It is simple in construction, easy to understand and handle, always ready for use, quick in its

movement of poise also imparts to the pencil a corresponding amount of motion in the direction of the drum's axis. These distances form the ordinates to the traced curve and represent the stresses. The other motion necessary to trace the line forming the curve which will be the *abscissa* representing the yielding of the specimen, is accomplished by revolving the drum corresponding to such yielding. This yielding motion of the specimen is transmitted to the drum as follows: Starting at the specimen 48, Fig. 3, two collars, 64, are placed upon it at a certain distance apart—say 8 inches, as now generally adopted. On the under side of the upper collar 64 are fingers, 83, one on each side of the specimen, so arranged that they will transmit the central motion of the specimen to the arm 83, which is pivoted for vertical motion at 88, Fig. 4. Any vertical motion of the specimen or upper collar is thus transmitted to point 101, then further communicated by a cord or steel band to one end of the lever 97, which is pivoted at 98. This lever, 97, is placed in a vertical plane under the edge of the balancing pivot of the beam.

Starting again at the specimen, on the lower collar 64 is placed another pair of fingers, 82, which, in the same manner as the upper fingers, transmit any vertical motion of the specimen to the vertical rod 87, Figs. 3, 4 and 5. The lower fingers 82 can be adjusted anywhere along the vertical rod 87, so as to be in proper place for the length of specimen operated upon.

The vertical rod is attached by a pivot to one end of the bar 74; the other end is supported on a pivot at 50, and at a point, 99, on this bar in the vertical plane of the balancing pivot of the beam is attached a band or cord, 95, which first runs down and over a pulley, 96, in the end of the lever 97, then up and over the guide pulley 99 to the enlarged part of the shaft 100 for the recording drum. Thus the vertical motion of the specimen, or the lower collar 64 on the specimen, is communicated to the recording drum, imparting motion to it or allowing same to turn on its axis. The function of lever, 97, whose end is connected to the fingers resting against the upper collar on the specimen, and the other end, in which is the pulley, to the fingers resting on the lower collar, is to separate the motion that takes place by the specimen as a whole from that motion which takes place in it and only between the collars, or to retain for transmission to the recording drum only what may be termed a difference of motion, the motion taking place either in or by the heads of the specimen not being transmitted to the drum.

Mr. Olsen then presented views illustrating the same autographic apparatus applied to a larger machine, and also to a machine designed for use on full sized structural specimens.

Discussion.

G. C. Henning said that there is always a great question as to what is good boiler steel, and it is very peculiar that when you look at a piece of steel, when it is tested in the machine, you can tell whether it is good boiler steel which will behave well in a boiler, particularly a locomotive boiler, by a very peculiar marking which appears on the test piece. By the aid of a drawing on the board it was shown that the marks intersect at the same angle throughout. When that marking is found in open hearth steel and the general factors are satisfactory it can be taken for granted

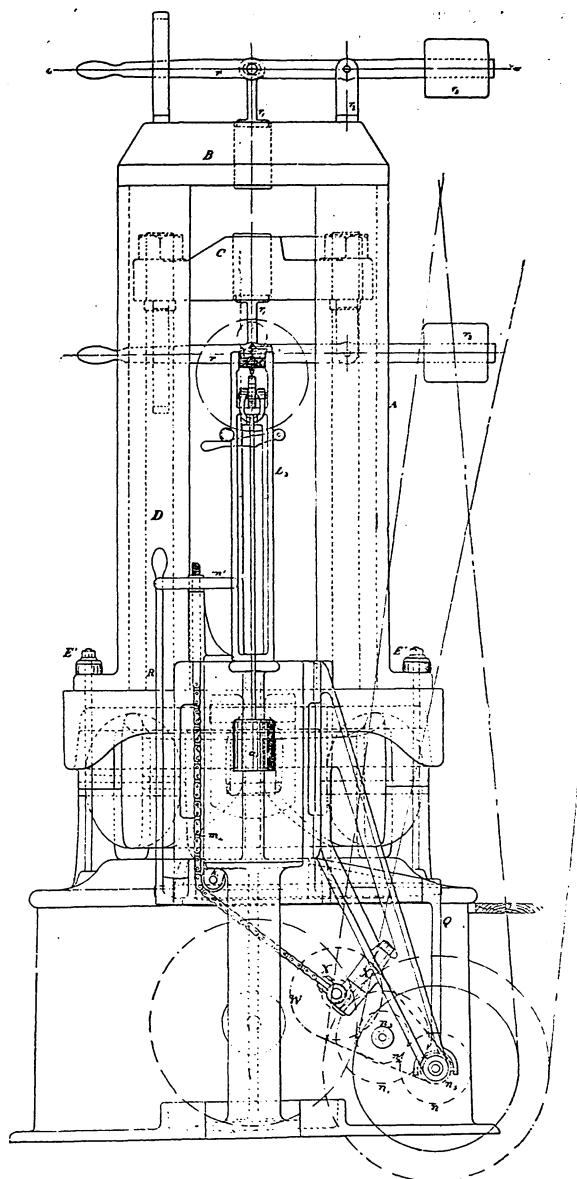


Fig. 2.—End Elevation.

THE OLSEN TESTING MACHINES.

application, and not more liable to get out of order than any other part of the machine, as well as of universal use—that is, applicable to the various classes of test.

I will now describe this device. On top of the beam, Fig. 3, is mounted the cylinder or drum, 102, which can revolve on its axle. To this drum is attached a sheet of paper, on which the object is to have the mechanism trace a diagram or curve line which will at the same time show both the stress and the amount of yielding of the specimen. A pencil at 103 traverses the drum and paper in the direction of its axis. It is moved by the same screw which moves the poise, 106, consequently any move-

ment of poise also imparts to the pencil a corresponding amount of motion in the direction of the drum's axis. These distances form the ordinates to the traced curve and represent the stresses. The other motion necessary to trace the line forming the curve which will be the *abscissa* representing the yielding of the specimen, is accomplished by revolving the drum corresponding to such yielding. This yielding motion of the specimen is transmitted to the drum as follows:

Starting at the specimen 48, Fig. 3, two collars, 64, are placed upon it at a certain distance apart—say 8 inches, as now generally adopted. On the under side of the upper collar 64 are fingers, 83, one on each side of the specimen, so arranged that they will transmit the central motion of the specimen to the arm 83, which is pivoted for vertical motion at 88, Fig. 4. Any vertical motion of the specimen or upper collar is thus transmitted to point 101, then further communicated by a cord or steel band to one end of the lever 97, which is pivoted at 98. This lever, 97, is placed in a vertical plane under the edge of the balancing pivot of the beam.

Starting again at the specimen, on the lower collar 64 is placed another pair of fingers, 82, which, in the same manner as the upper fingers, transmit any vertical motion of the specimen to the vertical rod 87, Figs. 3, 4 and 5. The lower fingers 82 can be adjusted anywhere along the vertical rod 87, so as to be in proper place for the length of specimen operated upon.

The vertical rod is attached by a pivot to one end of the bar 74; the other end is supported on a pivot at 50, and at a point, 99, on this bar in the vertical plane of the balancing pivot of the beam is attached a band or cord, 95, which first runs down and over a pulley, 96, in the end of the lever 97, then up and over the guide pulley 99 to the enlarged part of the shaft 100 for the recording drum. Thus the vertical motion of the specimen, or the lower collar 64 on the specimen, is communicated to the recording drum, imparting motion to it or allowing same to turn on its axis. The function of lever, 97, whose end is connected to the fingers resting against the upper collar on the specimen, and the other end, in which is the pulley, to the fingers resting on the lower collar, is to separate the motion that takes place by the specimen as a whole from that motion which takes place in it and only between the collars, or to retain for transmission to the recording drum only what may be termed a difference of motion, the motion taking place either in or by the heads of the specimen not being transmitted to the drum.

Mr. Olsen then presented views illustrating the same autographic apparatus applied to a larger machine, and also to a machine designed for use on full sized structural specimens.

that the steel is the best that can be got for boilers. If the specimen is entirely uniform and has no markings of any kind then the steel is not good for boilers. Then there is another peculiarity in telling whether the steel is really good or not. If in a flat specimen there is very gradual reduction, then that specimen shows that it is about as good a steel as can be had. If the steel has a shoulder in it, however slight, and then comes down, then there is something wrong in that steel.

I would like to say something about Mr. Olsen's diagraming apparatus. I think these diagrams are really remarkable. I do not think I have ever seen any more correct or more regular than these, and particularly so in these

paratus I would say that the prettiest thing I have ever seen is a photographic apparatus designed and used by Professor Marten of Berlin. He simply throws a ray of light from a little mirror on a sensitized film. The room is dark except for that ray of light, and having the mirror move in one direction by the motion of the weight, the position of which determines the load on the specimen, the revolution of this very small mirror throwing the beam of light across the sensitized film draws diagrams photographically, and he can magnify them as much as he likes, because it is only a question of casting the ray of light through a lens on a more or less distant screen. Afterward he develops them, and he has ob-

that only when he tests small objects, such as paper or silks. He has not used it for structural purposes."

M. N. Forney said that W. S. Hudson, formerly superintendent of the Rogers Locomotive Works, had noticed that in punching holes for the stay bolts in locomotive fire box plates there were curved lines radiating from the hole all the way round, and there was also another series of rings radiating in the reverse direction, the appearance being very much like the milling work on a watch case. Mr. Henning said they were simply lines of intersection of stress and would be produced if a plate was hit with a hammer.

A. E. Mitchell brought up the question of the proper speed to run a testing

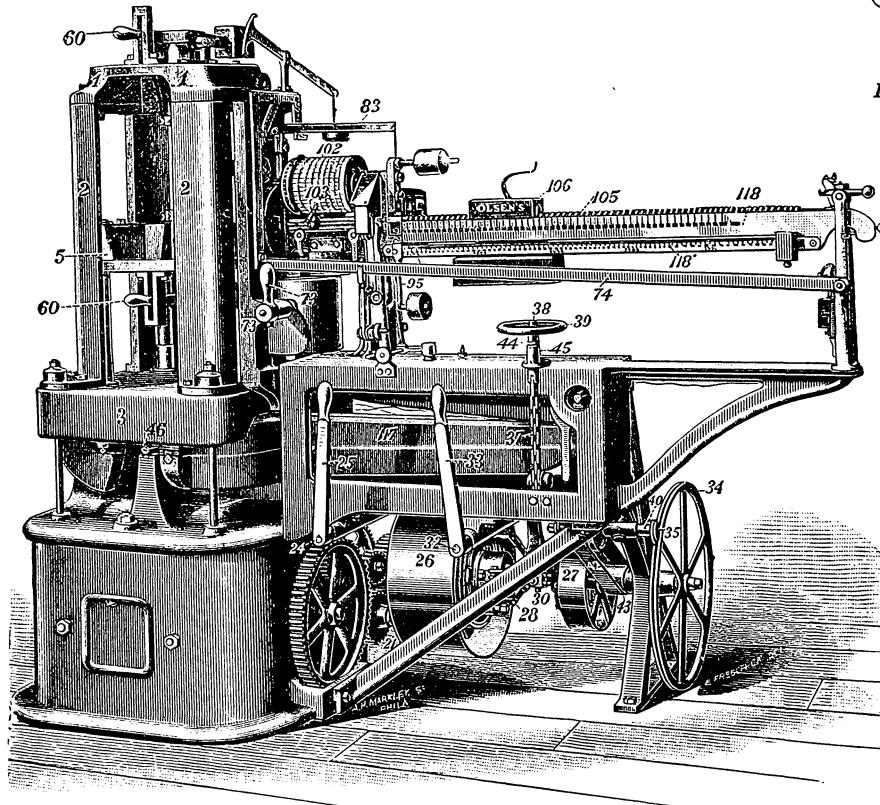


Fig. 3.—Perspective.

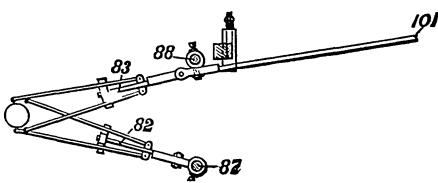


Fig. 4.—Levers Recording Yield Point and Elongation of Specimen.

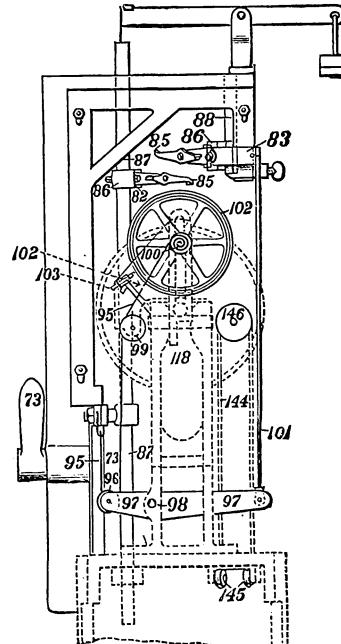


Fig. 5.—Device Transmitting Stretch of Specimen to Recording Drum.

THE OLSEN TESTING MACHINES.

woods. I think they are simply beautiful. You see this shows that this wood, which is white pine, is perfectly elastic. Hemlock is by no means elastic. Hemlock is by no means a desirable wood for building purposes, because it is so irregular and the fibers are not parallel, and hence some of the fibers may break before others. But in the case of oak you will notice how very straight this line is. There are some irregularities here, which I think must be due to some temporary derangement. When you get to the extreme test of that wood it becomes suddenly very weak, while in the case of white pine there is nothing of the sort. You have a gradual sliding of the fibers. Then in this case of ash you see a very decided break and a very good elastic line. Of course, it is stronger than white pine.

"In regard to the diagraming ap-

tained some very beautiful results. Another thing he does is rather unique. He makes a diagram of these minute extensions. These extensions within elastic limit are less than 0.01 inch actual measurement. He has a little apparatus consisting of a movable glass weight, and the specimen moves a diamond point. That diamond point engraves a fine line on the glass, and it is so small that the head of a pin will more than cover the whole diagram. Then he puts that in his lens and projects it on a screen. When thrown on a screen and compared with the observations of other instruments the results are comparable. But it is remarkable how you can make a microscopic picture like this and throw it on a screen and check up your results. Of course, he did not intend to check up his results by that diagram, but the diagram was sufficiently good to do that. He uses

machine. He said that if a plate is tested on a certain machine it will give results like the specification; but if tested on another machine at different speed the results would be different. He thought that an inch in three minutes was the proper speed.

Mr. Henning in reply said: If you test soft steel, especially basic steel, it does not make any difference what speed you test at within your capacity of observing anything about the test. Of course it is well known that in the Carnegie works you test so fast that you simply take the man's word for it that it carried that much. But if you know your business you do not let them run a machine so fast. There is a reason why the machine should show higher results when you run very fast, and that is you apply so much momentum through the test piece on to the beam, which is of considerable mass,

that it will always keep carrying more. When you come to a rest the machine balances all right. But as you keep on running, the weight is always ahead of the load you have on the test piece, and the faster you run the further the weight will be ahead of the load, in order to counteract the momentum due to the increase of the force applied. If you apply the same force, the momen-

where a firm wanted to send some copper for fire boxes to the Baldwin Locomotive Works, who were going to send some furnaces to South America, where they have a fondness for copper. They wanted some unprejudiced party to say what the copper would do. The requirement was, stretch 25 per cent. and tensile strength 35,000 pounds. They asked me what kind of sample I

post office and got Mr. Starbuck to test it, and got the test all right. I could not absolutely get that by any way by which the old Fairbanks machine could be run. The specifications were based on a hydraulic machine.

There is something, I am sure, in the speed at which the test is made beyond this mere inertia of the beam, which, of course, does enter as a problem when two tests are made at nearly the same speed. But where there is a great difference in the speed I think the material comes in.

Concerning the time of testing after rolling Mr. Henning said:

If you test material immediately after it comes from the rolls the material will be decidedly weaker than if you kept it lying idle from 12 to 24 hours. Our better rolling mills never give you a piece, especially thin shapes of plate or small bars, that has not had a chance to recover after being rolled. If you take a sample from a plate as it comes from the roll it will not give the ultimate strength, nor will it show the elastic limit or elongation, within a very considerable amount. So it is often a question of rejection or acceptance whether you allow the material to rest a while before you test it or whether you test it fresh from the rolls.

Rusting of Iron

Professor V. B. Lewis of the Royal Naval College, Greenwich, at a recent meeting of the Institute of Naval Architects in London, presented some interesting remarks as to the rusting of iron, which, he explained, is a definite chemical action due to the conjoint action of air, moisture, and carbon dioxide upon the metal. The increased rate of action may be due, he said, either to increase in chemical action brought about by local increase in temperature, or it may be due to galvanic action set up between portions of the same metal at different temperatures. The fact that the double bottom plates of ships near the boiler corrode more rapidly than similar plates in other parts of a vessel is undoubtedly, and the increase in temperature near the boiler is the only factor. It is also noteworthy that the plates at the bottom of the cellular spaces which are kept cool by contact with the sea water do not corrode; and cases are not wanting in which parts of a plate which get locally warmer than other parts—although the difference can only be a few degrees—corrode much more rapidly than the cooler portions. Experiments show that the rapid corrosion found in the double bottoms near the boilers or other sources of heat is due to galvanic action, and not to rise of temperature simply increasing chemical activity; but it must not be forgotten that when ashes are drawn and quenched with water—especially if sea water be used—gases having a corrosive action on metals are very apt to be liberated, and probably tend to increase the corrosion found near the boilers.

The freight rate on pig iron from Chicago to the Pacific Coast is now 30 cents per 100 pounds or \$6.72 per gross ton. This is the lowest transcontinental rate ever known. It is so low that Chicago manufacturers would be able to compete with English furnace men for the trade of the coast—if there was any trade. This may be termed a one-sided opportunity, which will of course be lost when trade revives.

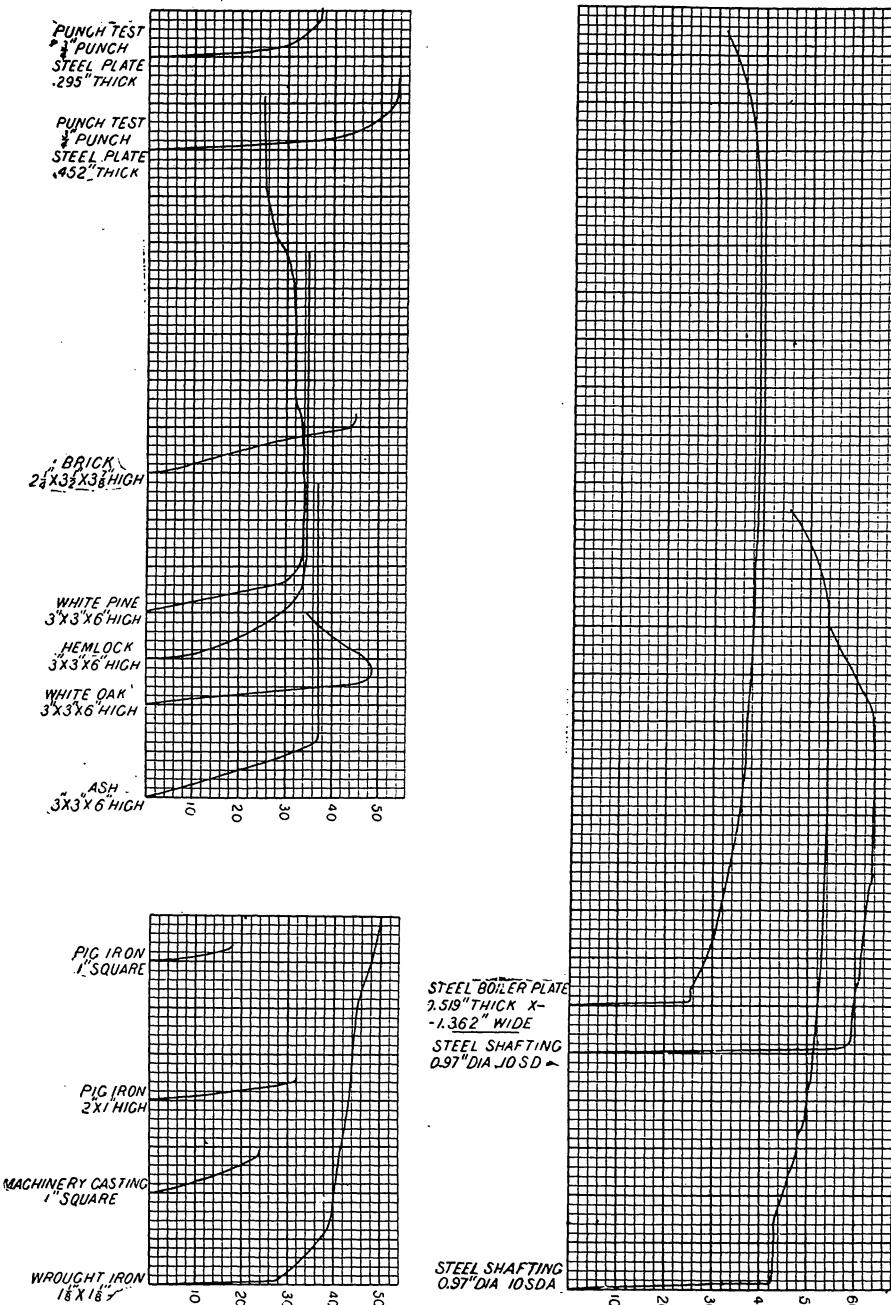


Fig. 6.—Diagrams Traced by Machine.

THE OLSEN TESTING MACHINES.

tum in the beam will be the same. There is always an increase of force applied. Hence there is always an increase of momentum, which must always be counterbalanced by a slightly advanced position in the weight. But if you run as fast as 2 inches in one minute on the ordinary soft steels you will not find any difference. When you test boiler steels which have different qualities altogether from the soft steels, there you find considerable difference.

Professor Hutton mentioned a case which came under his own observation,

wanted to test. I said give me at least 4 inches of reduced section taken from the $\frac{1}{2}$ -inch plate. We were running at that time on the old Fairbanks screw machine, and I found it impossible to give that 35,000 pounds, but I could give them 35 per cent. to 40 per cent. stretch right along, but we could not raise the tensile strength higher than 38,000 pounds. I finally told these gentlemen that I thought the Fairbanks machine was not the one to test this piece on, because those people down there are used to a hydraulic machine. So they took the specimen down to the

The Western Foundrymen's Association.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, April 18, 1894, at 225 Dearborn street, Chicago, Ill. In the absence of the president, C. K. Pittman was elected temporary chairman.

Among those present were the following: C. K. Pittman, Geo. H. Sargent, the Sargent Company; H. O. White, L. W. Lukins, Illinois Malleable Iron Company; N. C. Fisher, H. S. Vrooman, Garden City Sand Company; J. Bowie, Walburn-Swenson Company; John M. Sweeney, General Engineering Company; O. T. Stantial, Illinois Malleable Iron Company; H. L. Hollis, Hollis & Emmerton; J. K. Mackenzie, Dickman & Mackenzie; W. Leahy, Wells & French; F. W. Harrower, James Frake, H. O. Skinner, Henry O. Skinner & Co.; J. E. Moore, Cary & Moore; H. T. Murray, Robert Hughes, H. A. Forsythe, Backman & Forsythe; F. B. Whitcomb, A. T. Whiting, S. Johnston, Detroit Foundry Equipment Company; John H. Blood, J. L. Hecht, Wm. Dering & Co.; M. C. Bullock, M. C. Bullock Mfg. Company; A. W. McArthur, Rockford Foundry Company. The following applications for membership were read and the applicants unanimously accepted as members of the association: M. C. Bullock of the M. C. Bullock Mfg. Company, Chicago; E. C. Greenlee of Chicago, Matthew Addy & Co. of Chicago, Illinois Malleable Iron Company of Chicago, Antrim Iron Company of Mancelona, Mich., and Hollis & Emmerton of Chicago.

The secretary read the following paper by Thomas D. West entitled

Loss of Iron by Remelting and Slagging.

The last paper by Hon. E. A. Wheeler on "Furnace vs. Foundry Practice," before the Western Foundrymen's Association, February 28, 1894, cites the case of one of his customers losing 22 per cent. iron at the slag hole. I would say that the customer referred to is myself.

Before seriously discussing the subject in hand, it is essential that some explanation be made of the elements that have misled Mr. Wheeler in judging of the cause of our slag or the loss of iron, which he cites as occurring in our largest cupola. This cupola is 66 inches inside the lining, and by referring to the cut, Fig. 1, other dimensions can be obtained. Each heat averaged about 50 tons. The iron we use is all Bessemer pig; no scrap excepting a few gates, which for a 50-ton heat would weigh about 1 ton. Our Bessemer pig runs about 1.60 per cent. in silicon and 0.030 per cent. in sulphur, 0.29 per cent. manganese, 0.092 phosphorus. We use 2000 pounds of Connellsburg coke for the bed and 450 pounds between charges. The pig on bed was 8000 pounds and between charges 6000 pounds. This in a heat of 50 tons would leave us melting at the ratio of 1 to 11.24, and if we take into account 300 pounds of coke saved from the dump, it would leave us melting 1 to 11.63. Considering that we use about all pig iron and no light scrap iron to speak of, this, I think, will be conceded to be good melting.

About one year and a half ago a person was justified in calling the apparatus we now use for melting iron "a

cupola;" but since the writer has been experimenting with center blast, side blast, straight and crooked blasts, it is a hard matter to say what one is looking at, for the cupola is so full of holes with branch pipe and offset attachments there is hardly any cupola left. The slag when analyzed was found to contain 26.80 per cent. metallic iron as oxide. In addition to this there was 1.97 per cent. of very fine shot iron in the sample of slag selected. We use a No. 9 Sturtevant fan running 1400 revolutions, and the blast pressure raises a column of water 9 inches, which I consider a mild blast.

As we did not weigh the slag in these heats, we are unable to give the percentage of iron lost.

It was not 26.80 per cent. of the iron charged that was lost, but the slag coming from the cupola contained 26.80 per cent. of metallic iron. Mr. Wheeler seemed to infer from the slag being black that the cupola was working cold. It is enough for a foundryman to know that if slag runs freely and there is sufficient to keep two men busy wheeling it away from a cupola, the conditions are just the reverse of being cold. In fact, unless a cupola is working hot, the chances are very unfavorable to drawing off any slag.

Our foundry being about 300 feet from Mr. Wheeler's blast furnace, affords us exceptional opportunities in observing furnace vs. foundry practice when we desire to do so. At the time when we were making such an extra bulk of slag we learned that the furnace had just changed to a new mixture of ores, and this fact rather led me to think something might be wrong with the ores or their working in the blast furnace. For in remelting the iron I never saw such a volume of slag come from all pig iron. As it came out it foamed very much. I am now inclined to think that we did not have a great excess in weight over any ordinary heat where the slag runs out and solidifies in a fairly condensed body. But whether it weighed more or not it occupied fully four times the bulk of what generally comes from such sized heats, and I confess I am still at a loss to fully satisfy myself as to the exact cause. If it was not wholly due to the iron, the only cause I can ascribe it to is an excess of air blowing in through an upper tuyere E, Fig. 1, which upon the days in question was about 4 inches in diameter, and later on was gradually reduced to 3 inches in diameter. The iron might have had some peculiarity that took kindly to being oxidized to a foaming slag, and the little excess of air at this elevation overcame the balancing point, and thus caused the excessive bulk of slag we received. I cannot conceive of any other elements being responsible for the great bulk of slag on the days mentioned, as we had a large amount of coke and limestone on stock that was from one order, out of which the heats before and after this occurrence were supplied. We cannot think the trouble was due to the coke, and one car of limestone will run us for a month, so it could not be found in that element.

We present a sketch of the cupola in order that you may intelligently reason for yourselves as to its workings, and I know the peculiarity of its formation will attract attention. It is the writer's last experiment but one in the matter of approaching center blast. The design here shown was used for about six months and achieved very near the commendable results attained by the bottom center blast tuyeres which the

writer presented before this association October 18, 1893.

Returning to the subject of this paper, I can hardly refrain from giving weight to the character of the foaming slag as being more due to the iron than the blast. The furnace superintendent, P. C. Reed, intimated that the slag appeared as though it might be high in alumina, thereby causing its light foaming character, and implying that the furnace was not working well with its new mixture. He seemed inclined to think it might be due to the iron. In fact, he admits that the slag coming from the blast furnace when they changed to the new mixture foamed up just about the same as the slag did from our cupola. In this coincidence, no doubt, lies the key to the whole problem, as when we look to the blast entering our cupola we find all the difference that could exist would be the reduction of the diameter of the upper tuyere E, Fig. 1, from 4 inches down to 3 inches. It hardly seems possible that this should account for the large volume of foaming slag we found coming from our cupola.

Since this occurrence we have given considerable attention to the slag question, and Mr. McShiras, the chemist, finds by chemical analysis the following weights of iron to be lost through slags: In a heat of 40 tons March 15, 1894, we had slag coming from the slag hole weighing 1700 pounds. The analysis showed this slag to contain 3.34 per cent. of shot iron and oxide of iron equivalent to 17.25 per cent. metallic iron, a loss of 350 pounds of iron in the 1700 pounds of slag, and to the total weight of iron charged the percentage of loss would be thirty-nine one hundredths of 1 per cent.

Another heat of 40 tons on March 19, 1894, which we followed up, showed the slag to weigh 1630 pounds. The analysis of this gave 2.70 per cent. shot iron and an equivalent of 15.69 per cent. of metallic iron, a loss of 300 pounds in 1630 pounds of slag, and to the total weight of iron charged the percentage of loss would be $\frac{3}{10}$ of 1 per cent., which, figuring the iron at \$12 per ton, would show a loss of \$1.58, or a little less than 4 cents per ton. One little factor which it will be profitable to dwell upon before proceeding further with the paper is the reason for the difference of loss in the two 40-ton heats. As our metal is carried away from the cupola by a 5 ton ladle, and there are often lulls in getting back with the crane ladle, I have permitted the practice of leaving the slag hole open all the time, so as to make sure that the slag or metal do not reach the tuyeres. Feeling satisfied we were losing some metal by letting the blast continually blow out of the slag hole, I decided to try in the second heat quoted to plug and tap the slag hole at intervals, or just a few minutes before tapping out. By doing so we obtained, as shown, a saving of $\frac{1}{10}$ of 1 per cent. of the total weight of iron charged, or in other words, we saved 29 cents in a heat of 40 tons at the risk of letting the iron or slag fill up the tuyeres, and hence bung up the cupola. By this method of retarding melting, to save a little iron, we might lose several hundred dollars in castings through bad melting or dull iron.

Where conditions are favorable to tapping a slag hole at intervals, or just before tapping out the iron, the above figures clearly demonstrate the economy of such practice; and it is one that as a general thing can be safely followed; but in cases where the tap-

ping out and plugging up of a slag hole would require a man solely to look after it nothing is to be saved by this practice.

The limestone which we use for a flux proves by analysis to be exceptionally high in carbonate of lime, and we consider it the best we have ever had experience with. For every 3 tons we use 90 pounds, placed on top of every charge. There is no doubt that 1 or 2 hundred weight of slag could be added to the totals given above, which could be gathered from the skimming

inventory of all stock. For the year 1893 we find a loss from remelting of about 2½ per cent. There are chances, as can readily be seen, of part of this being lost in the way of fine scrap mixed with shop sands and dirt, and also wheeled out with the cinder and tumbling barrel refuse, and hence it would not be right to attribute it all to loss by melting.

As to whether we can burn iron I am not prepared to say; but we can look to oxidation for the greater percentage of loss in remelting iron, and the above

iron or bath being exposed by being freed of slag, and thus causing the extraordinary character of our slag on the days above cited. If that occurrence was due to our blast and not to any fault of the iron used, I would then say it was caused by an excess of air in the upper tuyere E, Fig. 1. This idea cannot but suggest the question, Are upper tuyeres according to their area larger promoters of oxidation than lower tuyeres?

I also think there is another feature of this subject that will bear discussion, and that is this: Will not some clean irons oxidize faster than others? Of course I mean this question to be chemically considered. We all know that the more surface we expose to the effects of blast and heat the faster the oxidation. And hence with light scrap iron we must expect the greater loss. But take our case, where one is using all good clean pig iron, we might put the question, Are there not chemical compositions in some pig metals more favorable to oxidation and volatilization than with others? Then, again, another question that will bear investigation is, What does slag come from? Taking the case of the first 40 ton heat cited above, we find there were 350 pounds of iron and 1230 pounds of limestone used for that heat, which we might figure as chiefly constituting the 1700 of the slag found, thus leaving us 120 pounds to account for. To cause thought and further discussion I will ask, What does this 120 pounds chiefly come from, scale of the iron, lining of the cupola or impurities of the fuel?

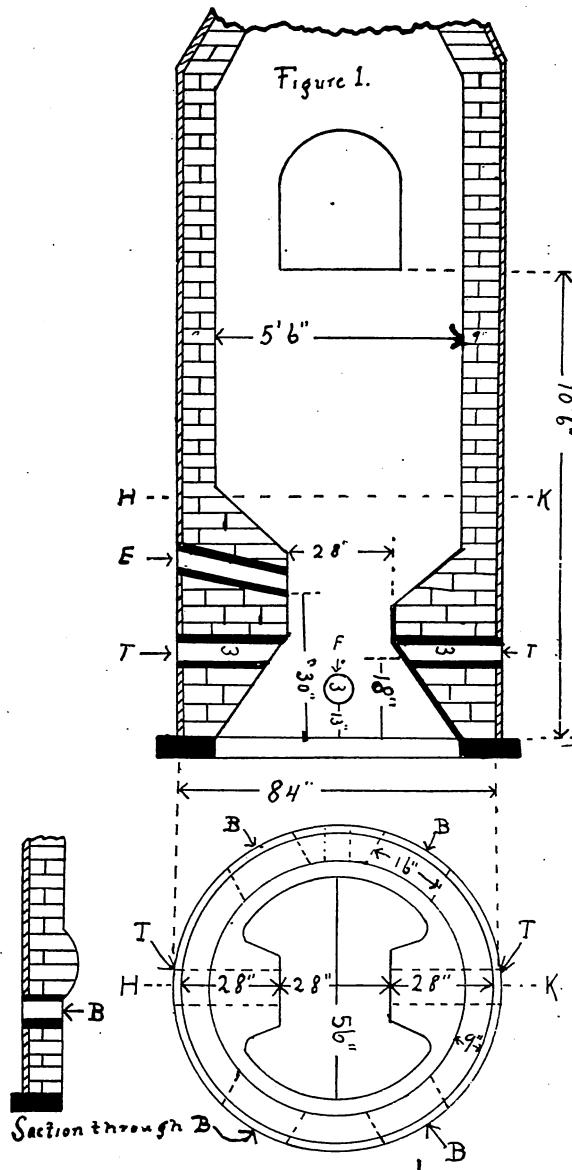
H. L. Hollis: The main part of the discussion should be taken up in answering some of the questions at the end of the paper. Mr. West has overlooked the ash of all his fuel, I think, in making up his slag. He probably has 10 per cent. ash in his coke, which would come very close to accounting for the 120 pounds that are lacking.

J. K. McKenzie: This paper does not state what kind of fuel they are using. The ash would amount to anywhere from 5 to 12 per cent. Mr. Hollis has taken the average of Connellsville coke. There is liable to be more or less variation on account of the different kinds of fuel. There is another point. In remelting iron there is a loss of silicon. The silicon is converted into silica and goes into the slag as such. In melting a large amount of iron it makes quite a considerable weight of slag. The average loss of silicon in remelting iron is 0.2 per cent. Another point is that the sulphur in the coke partly goes into the iron and some of it will go into the slag. It is an impurity. Also the manganese goes into the slag as oxide of manganese. Then again, the hot or cold working of the cupola would make a great difference. I have seen 2 per cent. of iron in the slag worked in a hot cupola, and 16 per cent. of iron worked in a cold cupola. The iron goes into the slag as ferrous silicate. I would like to ask if any one knows how much limestone is used. My experience would be about 1 to 25 for fluxing iron.

Mr. Pittman: Mr. West says 1230 pounds to 40 tons of metal.

Mr. McKenzie: Six thousand pounds of iron to 90 pounds of stone. That is 1 to 66. Is that not very little limestone to use for fluxing iron?

Mr. Sweeney: It has been my practice not to use much limestone. It does not appear clearly in this paper whether the droppings at the bottom are included in the estimate made in the slag loss.



WEST'S PROJECTING CENTER TUYERE CUPOLA.

of the ladle and the dropping of the bottoms. Our apprehension as to loss of iron through slag was allayed when we discovered it was less than one-half of 1 per cent. It is generally conceded by founders at large that loss through remelting unburnt cast iron ranges all the way from 2 per cent. up to 10 per cent., so we must look elsewhere than to slags for cause to effect the total loss generally found.

The heavy character and condition of our work will not permit a following after heats to find out the exact loss, and we can only get at it by deducting the weight of the castings made from the amount of metal bought during one year, which is not a bad plan, as at the end of each year we then take a careful

figures would lead us to believe that the greater loss was by way of the stack. I do think that an excessive blast does more in oxidizing and volatilizing the metal in a cupola and thus causing a loss than is generally conceded, and I also believe that the greater part of the oxidation or burning of the metal, as commonly termed, is done above the tuyeres, as the metal is dribbling from the melting point through the fuel down past the tuyeres to the bath of metal in the bottom, and also from the surface of the metal above the tuyeres at the melting point, as it momentarily exposes a semi-molten surface to the effect of the blast.

I do not accept the idea Mr. Wheeler advanced of the surface of the liquid

Mr. McKerzie: It does not seem to me that Mr. West's calculation is quite complete. It hardly seems fair to take one or two heats after you have your cupola in good running order and take the clean weight of metal and clean weight of slag from those two heats and calculate that as your average, when your cupola may be in for two or three days, and under these conditions the amount of slag and metallic iron might vary considerably. In dumping a cupola there is an endless quantity of waste material and partly melted stuff containing a large percentage of iron, and that should all go in and be charged up with the weight of the slag, beginning with the first blowing in of the cupola. I do not think it is fair to take two or three heats in the middle of the melt and call that an average. A loss of 0.33 per cent. of it seems very small to a practical man.

Mr. Bowie: Our average loss of iron is about 5 per cent.—that is, running from 15 to 20 ton heats a day in a 40-foot cupola having a 66-inch shell and 6-inch lining. I have never taken any notice whether atmospheric conditions would have any effect on cupolas. In running air furnaces I have noticed a great difference on different days. We had a 20 ton furnace and used to light it about five o'clock in the morning. We used the same iron and the same coal and would have the same men working, and some days the iron would be all melted by 11 o'clock and some days it would not be melted before one o'clock.

Mr. Sweeney: Air furnaces are affected by the way the wind blows, but the cupola is not to the same extent. With air furnaces, when the wind blows in one direction the furnace will be very hot and when the wind is in another direction the furnace will be very slow.

Mr. McKenzie: In a general way, as we all know, the foamy appearance of most substances is caused by occluded gases.

Mr. Bowie: The loss is so much less than I have ever been able to obtain, and the proportion of limestone so much less. Mr. West reports 0.31 per cent. loss in the heat, and I count myself very lucky when I run down to 3 per cent. His practice is 1 to 65 of limestone, when in ordinary practice it is 1 to 50 or 1 to 30.

Mr. Leahy: I think Mr. West is using altogether too much limestone. On our everyday heats we only use from about 1 to 50. In regard to the former question, I think the charging of the cupola has a great deal to do with it. Sometimes the iron and fuel will cling to the sides of the furnace, and in that way will cause it to be foamy. I have had it in my experience happen quite frequently where it was not charged properly.

Mr. Pittman: In what way was it charged to cause that foam?

Mr. Leahy: Sometimes I laid it down so that the fuel and iron were charged too close and did not allow it to come down to the melting points. I have always thought when a cupola foamed that it was not charged properly and I have always found this to be the fact on investigation.

Mr. Sweeney: I think the matter of limestone should not be compared as between foundrymen, because the man who melts from 15 to 20 tons of iron in a day would not have the same proportion as the man who melts from 40 to 50. It is that difference that makes so many different statements. With 15 to 20 tons I do not think any flux is

necessary. The larger the amount of heat the greater proportion of flux is used. The best place to get statistics about limestone would be in a Bessemer steel plant where the cupolas are kept running constantly, and where the comparisons are to some extent alike as between all steel works.

Mr. Whitcomb: I have had some experience in using limestone and I think what makes the iron foamy is too much blast and too much stone. If when the iron foams you will stop the blast for a few minutes you will not have any trouble. A man was once having trouble with his furnace in that way and he came to me for advice. I told him to slack his blast. He afterward said that it helped him out all right.

Mr. Stantial: I would not think of using limestone with 15 to 20 tons. On larger heats we have to use limestone. On large heats running from 45 to 50 tons we use from about 1 to 25 or 1 to 30. I have noticed the foaming, but have never paid particular attention to it.

Mr. Sweeney: I believe an excess of blast would cause foaming of the slag.

Mr. Stantial: We have been told tonight that this foaming could be laid to occluded gases. I rather think that it could be laid to air that is contained in it rather than the gases. The air that is blown into it might cause the foam. With a heavy blast on you will notice heavy festoons of mineral wool hanging all over your rafters. I think that is only carrying the thing a little further. I would like to ask one question, viz., Have any of the members used fluorspar and limestone in the cupola, and if so, do they consider one better than the other?

Mr. Whitcomb: I have used them both, but I could not tell that there was much difference. I do not think there is anything better to use than limestone clear.

Mr. Leahy: I have used fluorspar some. It seems as if one can get a very fine slag by the use of fluorspar and limestone both together. I have used them frequently in that way and found I got a very fine slag. In fact, I keep the fluorspar on hand right along, but we do not make a practice of using very much of it except when we run out of limestone. The objection I have to fluorspar is that it contains too much lead. It is pretty hard to get it clean.

Mr. Sargent: I should like to ask the expense of fluorspar as compared to limestone.

Mr. Stantial: I have used both of them and I have gone back to limestone as answering the purpose fully as well with a great saving in the first cost. As regards the comparative cost, I believe limestone can be had for \$1 a ton and fluorspar from \$6 to \$7 a ton. Although you can use less fluorspar than limestone, I never could get it down so cheaply.

Mr. Sargent: I heard of an interesting use for slag. Mr. Goetz of Milwaukee said he saw it used in Sweden for drying cores. That is not bearing on the question, but it is a matter of interest.

The secretary read a short paper by Dr. Edward G. Kirk on

Cost of Melting.

There is probably less known about the actual cost of melting iron in cupolas for foundry work than about any other branch of the foundry business. But few foundrymen make any attempt at keeping a cupola or melting account. Many of those who do, keep it in such a way that they not only fail to learn

the cost of melting, but are misled by the account to suppose their melting costs them a great deal less per ton than it really does. In the majority of foundries the melting is left entirely in the hands of the melter, who as a rule has no system for doing the work, and has no control over his assistants or interest in having them do a fair day's work. In many of the foundries I visit twice the number of men are employed as cupolamen as are employed in melting the same amount of iron in other foundries, where the facilities for handling the stock are almost the same, and the expense of lining and daubing material is frequently double with one melter what it is with another in the same sized cupola with the same sized heats.

In many foundries the fuel is not weighed, but is measured in baskets, or the number of shovels counted and the weight estimated. When the fuel is measured in baskets the baskets always stretch and enlarge, and an old basket frequently holds one third more than a new one; from 10 to 20 pounds more can easily be piled on the top of a basket after it is filled. Foundrymen who charge their fuel by the basket always use more fuel than they estimate they are using; when the shovels are counted, each shovel may be made to weigh more than is estimated, and a few extra shovelfuls are always thrown in, for fear some were not full. When too much fuel is used in a cupola there is not only a wastage of fuel, but there is slow melting, increased destruction of the lining and an increased wear and tear of the blast machinery. For these reasons every pound of fuel that goes into the cupola should be accurately weighed. Even when the fuel is supposed to be accurately weighed there should be some check on the melter, for he will shovel in extra fuel if not watched.

At a foundry I recently visited in New Jersey an accurate account of the melting had been kept for a year. At the end of the year the president of the company had figured up the amount of fuel consumed in the cupola and compared it with the amount purchased, and found they were short 260 tons. At another foundry, where the melter always reported melting 7 pounds of iron to 1 pound of anthracite coal, they ran short 300 tons in a year. This kind of work should be prevented by checking up the melter's report and comparing it with each carload of fuel consumed.

A cupola book should be provided, with blank spaces for recording the weight of coal or coke in the bed and charges, and the weight of each brand of iron, No. 1, 2 or 3 and scrap, showing the exact mixture of each charge and heat. A note should also be made of the quality of iron produced from the mixture. Such a record is of great value in making mixtures and charging a cupola, if it is properly kept.

The cost of melting per ton is figured in a number of different ways, but to be of any practical value the entire cost of melting should be figured on as follows:

Interest on cost of cupola plant and depreciation in value of same.

Fire brick for relining and repairs.

Fire clay, loam and sand for cupola and ladles.

Repairs to cupola, blast pipe, elevator, scaffold, runway, blower, &c.

Belts, oil, &c., for blower.

One-fourth the entire cost of engine.

Tools, wheelbarrows, buckets, hose, shovels, forks, rakes, hoes, sledges,

picks, bars, trowels, bod sticks, tap bars, &c.

Wood for lighting up and dredging ladles.

Coal or coke consumed in melting.

Labor employed in removing the dump, making up cupola, milling dump and gates, collecting gates, scrap and bad casting from foundry, placing iron and fuel on scaffold, charging, breaking and piling iron in yard, breaking up bad castings, daubing ladles, &c.

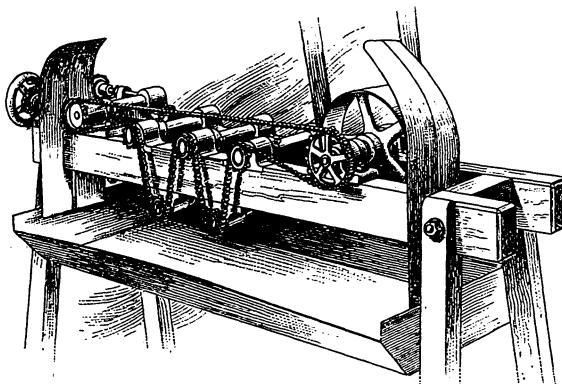
When the cost of all these items has been learned, and the amount divided

last week. The following firms are interested in the Mahoning Ore Company: The Mahoning Valley Iron Company, C. D. Arms, the Andrews Brothers Company and the Monongahela Furnace Company of McKeesport.

siderable business, but in the face of a limited demand. Little is being done at the bottle fastener works of H. W. Putnam, there being a large product stored. The season is approaching, however, when the demand is expected to increase, and the works will then resume in full. The large machine shop and foundry of Olin Scott have been running of late on small orders. The Cooper Mfg. Company, after five months' idleness, have again started on full time with a full complement of employees.

Bicycle Chain Testing Machine.

The center links of the chains made by E. C. Stearns & Co. of Syracuse, N. Y., for their bicycles are made of



BICYCLE CHAIN TESTING MACHINE.

by the number of tons melted, it will be found that the cost of melting is about \$2 per net ton of iron in the ladles. In foundries with all the modern improvements for handling the stock the cost is a little less than \$2 per ton, and in foundries with none of the improvements for handling the stock and no system in melting the cost per ton is as high as \$3. When there is doubt as to the accuracy of weights in charging, the weights should be compared with the fuel purchased and castings sold, and the cost of melting may be figured on the weight of castings sold in the place of the amount of iron melted. To make a cupola report of value the fuel, labor and tool accounts should be kept separate, and an effort made to reduce the expense of each account.

Mr. Bowie : I think that the cost of melting iron is generally given as lower than it really is. I have known of cases myself in which, when the estimates were made and compared with the amount of fuel bought and the amount reported used, there would be a difference of several hundred pounds. Of course it had been used but not taken into account. We paid our melter so much per ton, including his labor and fuel. We paid him on a sliding scale according to the size of our heats. He did all the work and was charged for the fuel.

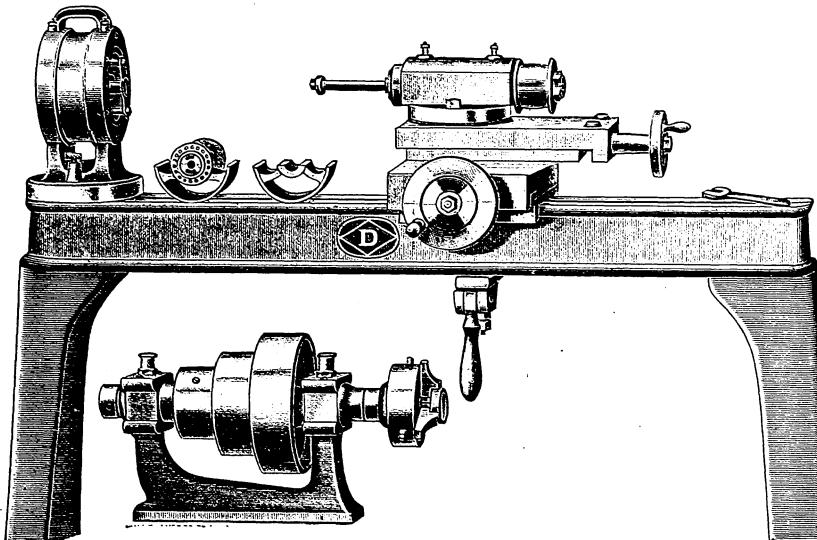
Mr. Hughes : It seems to me that we cannot compare the large works where they have so much apparatus for handling the material with the small foundries where most of the work is done by hand. The cost of labor would be different. The cost of the plant would also have to be taken into account.

The Mahoning Ore Company of Youngstown, Ohio, have filed papers with the Secretary of State increasing the capital stock from \$40,000 to \$100,000. This increase was decided upon at the meeting of the stockholders held in the offices of the Andrews & Hitchcock Iron Company, Youngstown, Ohio,

hardened tool steel, and the side links of stamping steel. After the chains have been set up and riveted they are put under a strain of 2000 pounds, after which they are placed on the testing machine which we illustrate. This machine consists of a series of sprocket wheels so arranged as to give the chain passing around them a facility of action that could not be obtained in actual use. The chain is run at a speed of

The Diamond Ball Bearing Grinding Machine.

Manufacturers of bicycles who have used ground and true balls for their bearings found that it was essential to secure a true ground seat or surface for the balls to travel in, and that without it the best results could not be obtained. The machine here illustrated was designed by the Diamond Machine Company of Providence, R. I., to do this work. It is arranged with two heads and two styles of chucks. One of the heads and chucks holds the small circular hubs to be ground true for the balls to revolve in. The other head and special chuck is arranged to hold the bearings of the wheel hubs and pedals, both of which require a true, smooth surface to give the best results. This latter head is arranged to grind one end of the bearings, after which the head is swung one-half way round without removing the work from the special chuck which holds it. This insures both ends being ground perfectly true and parallel with each other. The carriage in which the emery wheel revolves has movements by hand wheel and screw both lateral and longitudinal. It is arranged with a swivel head to secure any angle. The emery wheel spindle is made of steel



THE DIAMOND BALL BEARING GRINDING MACHINE.

about 2 miles per minute and for a time sufficient to develop any possible imperfection. The quality of the chain is shown by the statement that $\frac{1}{2}$ inch is the greatest increase in length ever noted in a chain after having been tested on this machine.

Nearly all the manufacturing industries at Bennington, Vt., have started up and in the aggregate are doing con-

with long bearing bronze split box, and fitted every way secure from emery dust. Also arranged to secure a high rate of speed for the emery wheel. There is one arbor provided to hold the small wheels, which latter is fitted to taper in the spindle head. There is one split chuck provided to hold emery plugs three inches long, which as worn away can be brought forward from the chuck. The necessary countershafts and drums are supplied with the machine.

San Francisco News.

The freight question is again going to cut a considerable figure in commercial circles for some time to come. It was thought when the North American Navigation Company took the field and kept it so long that the freight question was settled for all time to come. But it was not so to be. The company was once or twice on the eve of bankruptcy and it has at last given up the ghost. It is no more, and the vessels employed by it go over to the Panama Railroad Company. They are advertised now in the name of that company. This has been followed by an immediate advance in freights on the part of the Southern Pacific, and the Panama Railroad Company will follow in their track. They will not, of course, advance proportionately, and San Francisco will still have a considerable advantage in water rates over those by rail, unless, indeed, Huntington should buy up the Panama Railroad opposition, when San Francisco merchants would be driven back to the two clipper lines again. The advance in rates has been from 20 to 50 per cent, and will be felt, perhaps, more in hardware, iron and metals generally than in anything else.

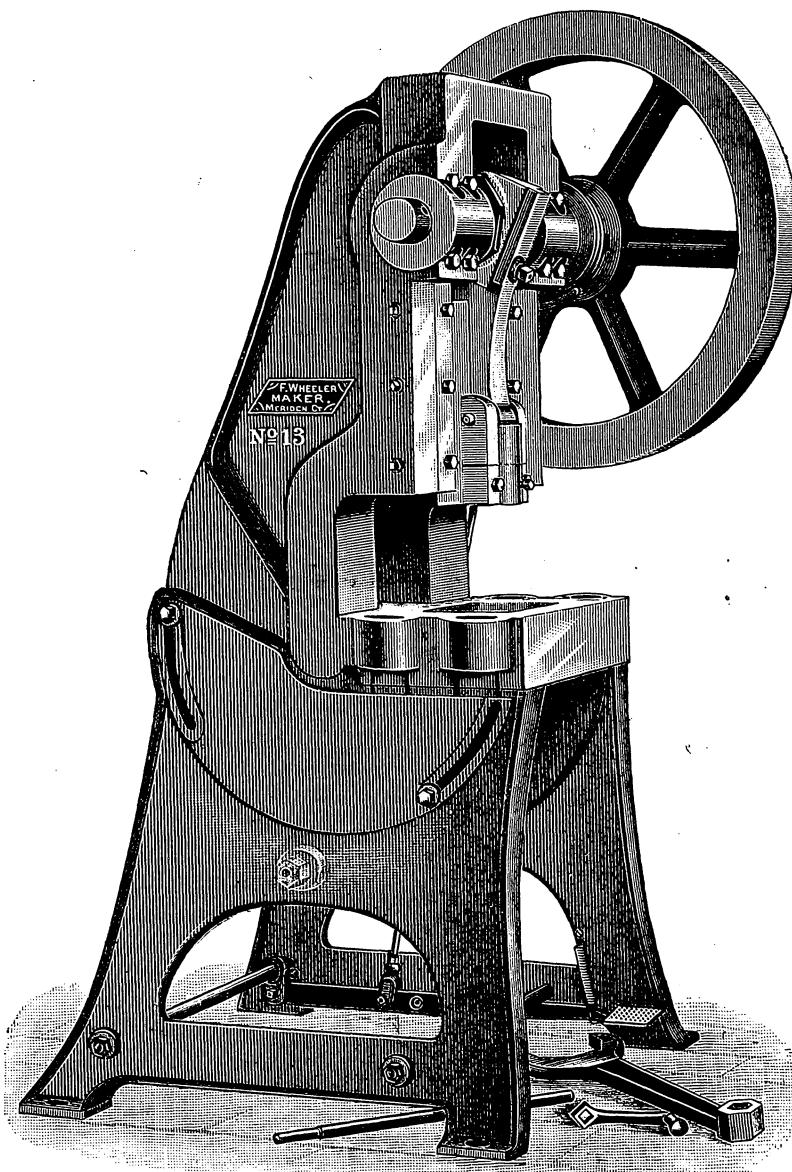
The result will not, as far as we can see at present, benefit the railroad in any respect, as the lower sea rates will continue to draw the bulk of the business that way. San Francisco has still the whip hand, although the failure of the North American Navigation Company to keep their vessels in the field is decidedly discouraging. Enough of the merchants could not be found to work together to keep the business going, although it was estimated that in one year there had been saved to the merchants and consumers, the latter principally, \$8,000,000 in freights. The year, however, was a bad one. The merchants made no money directly, the consumers seemed careless, and so the matter was allowed to fall through. The next thing in order is for Huntington to capture the Panama Railroad, and then his victory, although not complete, would be satisfying. So long as Grace & Co. keep their vessel afloat the merchants will have a cheap freight rate for all their bulky non perishable goods. In the battle which has been fought the hardwaremen were notable for their pluck and endurance. The leading spirit of the Traffic Association was one of our foremost hardwaremen, and they have fought to a successful conclusion the battle for freedom to ship American goods to European ports and tranship them again to San Francisco. The suit was entitled "The United States *vs.* 250 kegs of nails." A couple of years ago the Dunham, Carrigan & Hayden Company shipped a large quantity of nails, hardware, &c., by a Belgian steamer to Antwerp and thence by sailing vessel to this city. This they did a great deal cheaper than they could have done by either steamer, clipper or railroad direct. The Southern Pacific at once started on the war path and contended that a foreign vessel could not carry goods between American ports, claiming that the voyage from New York to Antwerp and the transhipment to San Francisco was all one and the same transaction. Collector of the Port Phelps seized the nails. The lower court here decided against him, but it was carried to the United States Court of Appeals, which has just sustained the lower court. This opens another way to ship cheaply to this city from Atlantic ports, and the trade are correspondingly rejoiced thereat.

The bid for the completion of the dome at the new City Hall has at last been awarded, but not without exciting considerable feeling. The lowest bidders were O'Connell & Lewis, composing one of the oldest firms engaged in architectural work in the city. Their bid was \$249,700, which, after considerable discussion and angry feeling, was adopted. The firm offered to do the work for \$20,000 less if they could buy the iron and steel to be used in the work in the East. This the Board of Supervisors refused to allow, and the

this is good news to all engaged in these various lines of business. There is no special change to note in any department of this business at present and matters remain as I have previously reported.

The Wheeler Press.

This press, built by Frank Wheeler of Meriden, Conn., is provided with an incline adjustment, consisting of a sliding box placed on top of the pitman. The solid pitman is so arranged that all



THE WHEELER PRESS.

contract was awarded on the express condition that the iron and steel used should be all California made. We have two establishments able to do all that may be needed toward supplying iron and steel and accordingly one or other of them or both will have the job of manufacturing the iron and steel to be used.

The institutions that have the chance of providing the iron and steel are the Pacific Rolling Mills and the Judson Iron & Steel Works. As work is to start right away it will give employment for some months and at good wages to several hundred men. Coming so soon after the reduction of wages at the Union Iron Works, on account of the scarcity of work there,

the strain and pressure come upon solid metal, the lower end of the pitman being seated in the solid metal of the slide or gate, and not resting upon a screw or pin. For adjusting the punch to the die it is simply necessary to turn a screw after loosening the clamping nut, when the box can be moved up or down the incline to the desired position.

The pressure at the time when the press is doing its heaviest work is brought squarely upon the end of the pitman, thereby relieving the adjusting screw and clamping nut from all strain and obviating the tendency to slip or strip the thread of the screw.

The machine is provided with a double clutch, which makes two points of contact simultaneously on opposite

sides of and in and near the center of the press shaft. This does away with the cramping and twisting tendencies usual in clutches where the contact is made at only one point. By means of an automatic brake the press is stopped gradually and easily, there being no jolt or jar. The grate is so constructed as to take up all wear automatically and is provided with a self oiling device. The machine has a positive "stop up," which is simple in construction and automatic in operation.

The King Chain Hoist.

This block has been in use for several years in many large manufacturing estab-

lishments of Europe, including the German and British navies and the Krupp works. It was invented by a German named Luders, who holds letters patent from Germany, England, Belgium and the United States. It is now being introduced in this country by Charles G. Eckstein & Co. of New York.

The block is of the usual form, the hoisting apparatus consisting of a worm shaft that engages in the hoisting chain wheel, the shaft being turned by a small chain windlass. A special feature of the block is that all parts are of wrought iron or steel except the three chain wheels numbered 3, 9 and 13, Fig. 1. All the shafts are of steel, the worm shaft being of extra quality, case hardened. The frame is of homogeneous steel plate, and all the other parts except the wheels mentioned are of the best wrought iron. The friction rings and bearings are of gun metal, marked 5 and 8. The wrought iron parts are dropped forgings and are interchange-

able, and the block throughout is of turned and fitted work. The chain is imported and tested before going into the block, and every block is tested after it is assembled. Ten different sizes are manufactured, whose lifting capacity ranges from 1000 to 20,000 pounds, the weights varying from 72 to 600 pounds and the lifts from 9 to 12 feet. The prices are from \$25 to \$340, from which a liberal discount is made. Every block is designed so that one man weighing 165 pounds can lift the maximum load of the block.

The patented features are shown in Figs. 2 and 3, which is a friction brake. Fig. 3 shows this friction brake attached to the worm shaft. It consists of a collar, *d*, fixed to the worm shaft

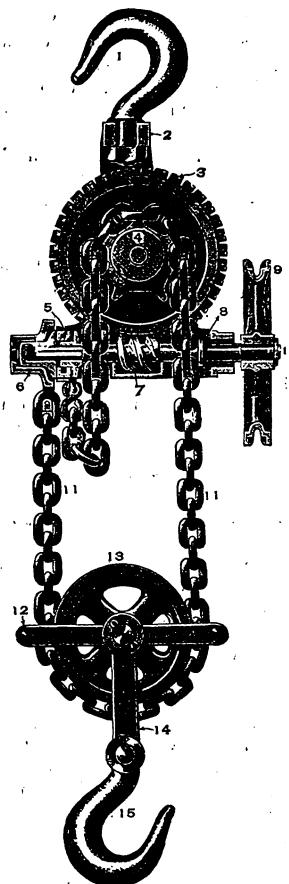


Fig. 1.—Sectional Elevation.

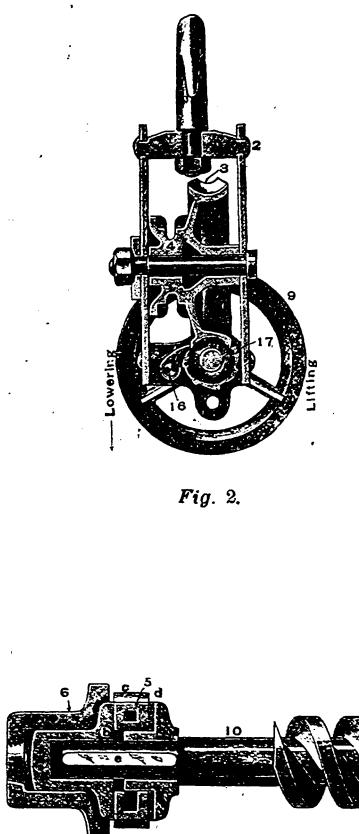


Fig. 2.—Worm Shaft and Friction Brake.

THE KING CHAIN HOIST.

lishments of Europe, including the German and British navies and the Krupp works. It was invented by a German named Luders, who holds letters patent from Germany, England, Belgium and the United States. It is now being introduced in this country by Charles G. Eckstein & Co. of New York.

The block is of the usual form, the hoisting apparatus consisting of a worm shaft that engages in the hoisting chain wheel, the shaft being turned by a small chain windlass. A special feature of the block is that all parts are of wrought iron or steel except the three chain wheels numbered 3, 9 and 13, Fig. 1. All the shafts are of steel, the worm shaft being of extra quality, case hardened. The frame is of homogeneous steel plate, and all the other parts except the wheels mentioned are of the best wrought iron. The friction rings and bearings are of gun metal, marked 5 and 8. The wrought iron parts are dropped forgings and are interchange-

able, and the block throughout is of turned and fitted work. The chain is imported and tested before going into the block, and every block is tested after it is assembled. Ten different sizes are manufactured, whose lifting capacity ranges from 1000 to 20,000 pounds, the weights varying from 72 to 600 pounds and the lifts from 9 to 12 feet. The prices are from \$25 to \$340, from which a liberal discount is made. Every block is designed so that one man weighing 165 pounds can lift the maximum load of the block.

The patented features are shown in Figs. 2 and 3, which is a friction brake. Fig. 3 shows this friction brake attached to the worm shaft. It consists of a collar, *d*, fixed to the worm shaft

Southern Pig Iron Rates.—The Queen and Crescent Route has issued Tariff No. 34, effective April 23, giving rates on pig iron in carload lots from Southern furnaces to points North, South and West. The rates of the principal points are given below:

To	From Dayton and Rockwood, Tenn.	Chattanooga, Tenn.	Rising Fawn, Ga., and Fort Payne, Ala.	Birmingham district.
Anderson, Ind.	\$2.30	\$2.50	\$2.75	\$2.75
Buffalo, N. Y.	2.80	3.00	3.25	3.50
Chicago, Ill.	2.55	2.75	3.00	3.00
Cincinnati, Ohio	1.55	1.75	2.00	2.25
Cleveland, Ohio	2.30	2.50	2.75	3.00
Columbus, Ohio	2.00	2.20	2.45	2.70
Dayton, Ohio	1.80	2.00	2.25	2.50
Detroit, Mich.	2.55	2.75	3.00	3.00
East St. Louis, Ill.	2.30	2.50	2.75	2.75
Evansville, Ind.	1.80	2.00	2.25	2.25
Hamilton, Ontario	3.30	3.50	3.75	4.00
Indianapolis, Ind.	2.30	2.50	2.75	2.75
Ironton, Ohio	2.19	2.39	2.64	2.89
Joliet, Ill.	2.80	3.00	3.25	3.25
Louisville, Ky.	1.55	1.75	2.00	2.00
Milwaukee, Wis. (all rail)	3.00	3.20	3.45	3.45
Muncie, Ind.	2.40	2.60	2.85	2.85
Peoria, Ill.	2.55	2.75	3.00	3.00
Pittsburgh district, Pa.	2.80	3.00	3.25	3.50
Pueblo, Col.	8.59	8.59	8.59	8.59
St. Louis, Mo.	2.30	2.50	2.75	2.75
St. Paul, Minn.	4.50	4.70	4.95	4.95
Springfield, Ill.	2.65	2.85	3.10	3.10
Springfield, Ohio	2.00	2.20	2.45	2.70
Superior, Wis.	4.69	4.89	5.14	5.14
Toledo, Ohio	2.30	2.50	2.75	3.00
Topeka, Kan.	5.84	5.84	5.84	5.84
Wheeling, W. Va.	2.80	3.00	3.25	3.50
Youngstown, Ohio	2.55	2.75	3.00	3.25
Zanesville, Ohio	2.40	2.60	2.85	3.10

The rates from the Birmingham district also apply to the following furnaces: Gadsden, Ala.; Anniston and Tallapoosa, Ala.; Round Mountain, Ala.; Cedartown, Etna, Hermitage and Rome, Ga.; Langdon, Rock Run and Tecumseh, Ala.; Ironaton, Jenifer and Talladega, Ala.

The Midland Steel Company.—A recent issue of the Muncie (Ind.) *Daily Times* contains a very interesting article relative to the operations of the Midland Steel Company. This concern have quite recently entered upon the manufacture of light sheets, having been established in the fall of 1892. Their works are of large capacity, their output the past year having been 10,000 gross tons. Notwithstanding the disturbed condition of financial affairs last summer and the dullness of general trade since then, the works have not been obliged to shut down for lack of orders since they were first started. One secret of their good fortune is probably the fact that they make an effort to supply specialties in steel sheets of fine finish and high grades, instead of

depending solely on the production of staple sizes and grades. Their sheets are exclusively made of open hearth steel, produced in their own furnaces. The enlargement of the plant is regarded as an early necessity. The officers of the company are as follows: R. J. Beatty, president, Muncie; John A. McVoy, vice president, Chicago; J. G. Battelle, treasurer, Piqua, Ohio; J. R. Wick, secretary, Muncie. The stockholders reside in Piqua and Cleveland, Ohio, Pittsburgh and Chicago. James W. Ross, room 647 The Rookery, Chicago, represents the company as sales agent for Chicago and the West generally east of the Missouri River.

THE WEEK.

The Cataract Electric Company of Buffalo, N. Y., have closed a contract with the Niagara Falls Power Company, whereby power will be supplied for use in Buffalo about October 1.

The prolonged conflict in Brazil has at length been brought to a period. Official dispatches confirm the fact of the sinking of the insurgent battle ship "Aquidaban" by a federal torpedo boat in the harbor of Santa Catharena on April 16. Admiral Mello has given up the struggle, and, with five ships, has surrendered to and obtained asylum from the Argentine Government at Buenos Ayres. The revolutionary movement is said to have completely collapsed.

Ex-President Harrison, in concluding his course of law lectures at the Stanford University of California, gave the students some advice which is significant as coming from so competent a source. He counseled them to "stick to their profession, avoid politics and never seek office."

A shipment of 2800 tons of bituminous coal was made last week from Baltimore to Montreal, Canada, although a duty of 60 cents a ton and freight charges bring the price of the fuel considerably over that of the Nova Scotia product. Some of the Canadian manufacturers are, however, dissatisfied with the domestic coal, and it is for these parties that the present shipment, the first of its kind, has been made.

The negotiations for a proposed transatlantic steamship pool have fallen through and will not, it is said, be resumed. A rate war in steerage passenger traffic has been inaugurated between the British and Continental lines of steamers.

As the result of investigations recently made by the Commissioner of Navigation, that official estimates that Americans own and operate under foreign flags a steam tonnage equal to or greater than one-half the steam tonnage registered under the American flag.

The depression in business and the accompanying restriction of imports is clearly illustrated by a statement of Custom House receipts since the beginning of the fiscal year, published in the *Journal of Commerce*. These receipts are shown to have fallen off \$41,224,363, or nearly 40 per cent. as compared with those of the corresponding portion of the last fiscal year.

Canadian trade returns for the nine months ended March 31 show a slight decrease in both exports and imports. Exports were \$89,506,306, or \$41,000 less than in the corresponding period of last year, while the imports were

\$86,197,918, or \$825,022 less. The duty collected for the period exhibits a falling off of \$500,000.

The new truck receiving station of the Pennsylvania Railroad, in Jersey City, is of very large dimensions. It is 655 feet long and 92 feet wide. Eighty trucks can unload at once on each side of the platform.

The delay in the construction of the new dry dock at the Brooklyn Navy Yard is attracting the dissatisfied attention of the Government. It is very probable that the present contract with Mr. Gillis may be revoked, and the Government may either carry on the work itself or allow another private firm to complete the dock, which is urgently needed for the ships of the new navy.

Negotiations are, it is said, pending for uniting the independent cordage interests of the country with the United States Cordage Company.

There is a probability that the pottery troubles which have agitated Trenton, N. J., for so long may be settled by an agreement between the manufacturers and the men before the end of the present week. About 4000 operatives have been locked out in that center of the pottery trade since last January.

Ground was broken on April 18 for the work of sewerage the city of New Orleans.

The umbrella trust is reported to be in a state of disintegration. The combination was formed about two years ago with a nominal capital of \$8,000,000, and included most of the leading manufacturers. It is not, however, proving remunerative, and has not served to quell competition.

Penny in the slot machines have been put under the ban in Chicago.

Philadelphia business men complain bitterly of the disadvantages suffered by their city from the discrimination practiced by the railroads in the matter of freight rates. Concerted action will be taken by them, it is said, with a view of improving and enlarging the transportation and shipping interests of Philadelphia, which have suffered severely of late.

The Daniels Steel Railroad Tie Company of Youngstown, Ohio, recently incorporated, with a capital stock of \$50,000, have completed their organization by the election of Robert E. Daniels as president and Thompson Burton general manager. A number of these ties have been made at the Valley mill, rolls having been manufactured and set up for the purpose.

The ties are dropped after rolling into a vat filled with tar, where they remain for 24 hours, until the pores are thoroughly filled, thus preventing all trouble from oxidation and making the ties capable of very long endurance. The promoters of the enterprise are enthusiastic in their belief that the Daniels tie will supersede the wooden tie in a very short time, for it is asserted to be without the objectionable features that have been brought against ties of metal manufacture.

The Pittsburgh Bridge Company of Pittsburgh, and not the Keystone Bridge Works, have the contract for the erection of the new buildings for the Lincoln Foundry & Machine Company, under construction at Pittsburgh. These buildings will be of steel, and about 400 tons will be required.

Another Chicago Railway Tunnel.

After four years of difficult work, involving great engineering skill, the Van Buren street tunnel in Chicago has been completed. It was delayed for some time by litigation, however, or it would have been ready for use long ere this. Although called the Van Buren street tunnel, it is not to be used for ordinary street travel, but only by the cable cars of the Van Buren street system of the West Chicago Street Railway Company. The tunnel was built under the supervision of Samuel G. Artingstall, chief engineer; C. B. Weston, resident engineer; and S. Potis, chief mechanical engineer. It passes under the south branch of the Chicago River, connecting the central part of the city with the west side, and avoids the annoying delay of crossing the river, with the traffic interrupted by the swinging bridges. It begins a long distance from the west bank of the river, burrowing under a network of 21 railroad tracks running into the Union Depot.

It passes directly beneath a seven-story and basement brick building on the west side and a six-story building on the east side of the river. In constructing the tunnel it was found necessary to take down this seven-story building and afterward rebuild it. On the east side the tunnel has a uniform grade of 10 per cent. for 499.1 feet. At the river the grade is flattened to 1.81 per cent. each way from the center, the distance being 210.86 feet. The west side of the tunnel, 487.44 feet, has a grade of 5.46 per cent. and the approach, 316.5 feet, a grade of 7.93 per cent.

To prevent accidents on the grades two heavy toothed racks have been constructed midway between slot and rails and 2½ inches above the surface level. In this a heavy pinion beneath the car engages, connected with a friction clutch and operated by a foot lever, placed in front of the gripman. The construction is heavy enough to stand a sudden shock without danger of breaking, and it is believed will prevent all possibility of accidents from runaway cars. A space of 5 feet exists between car and wall and artificial ventilation is unnecessary. The tunnel is a three-center arch of seven concentric rings 32 inches thick. The two outer rings are laid in asphalt mortar, giving protection against moisture on the surface of the brick work.

At the power house at Van Buren and Jefferson streets are two large Reynolds Corliss engines, 38 x 60 inches, manufactured by the Edward P. Allis Company, Milwaukee. They make 50 revolutions a minute and each develops 1250 horse-power. Only one is to be used at a time. Light for the tunnel and for the two buildings undermined is furnished by Waddell-Euse dynamos, each of 40 arc light capacity. Coupled to these dynamos are three engines, manufactured by J. H. McEwen Mfg. Company, Ridgway, Pa., a battery of six boilers of 700 horse-power furnishing the steam. The tunnel is drained by a 4 inch suction pipe equipped with a George E. Nye steam pump. The construction of this tunnel has been prosecuted almost without regard to cost, in order to make it as perfect as possible in all respects. It is much more capacious than any of the other Chicago tunnels, and avoids objectionable features which experience developed in them. Its completion has excited much interest in engineering circles.

The Iron Age

New York, Thursday, April 26, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRKHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - BUSINESS MANAGER.

Can Prices Go Lower?

Buyers, and for that matter sellers, have apparently become so accustomed to receding prices of iron and steel that it will take a few very sharp successive advances before the spell of low values is broken. In every department of the iron trade, with one exception, goods have been sold at lower prices during the current year than ever in the history of the industry in this country. In some branches they are lower than they are in Europe. Every interest which contributes to the cost of laying down product at the door of the consumer is down to the minimum basis. Beginning with the ore, the only item in the cost sheet which has not been generally scaled down is the royalty. Profits are gone, labor is down to the lowest notch, supplies are as cheap as they ever have been, dead work is practically abandoned and railroad and lake freights are very low. In the smelting of the ore in the blast furnace coke has dropped to figures which can only be justified on the theory that powerful Connellsville interests are squeezing the minor operators into selling their property. It is stated that the makers of Bessemer pig in the Central West are earning a little money at present prices, but on all other grades of pig iron South and East producers are not getting back a new dollar for an old one.

Turning to the conversion of pig into soft steel, we find that prices are now a trifle higher than they were and the inference is generally made that the best equipped modern steel works in Western Pennsylvania are enjoying a very modest margin.

Although the raw materials, pig iron, soft steel and melting and rolling mill scrap, are all very low, and although labor is receiving wages unprecedented in the different districts, the decline in prices has kept pace with reduced cost. Wire rods, it is true, did enjoy a temporary spurt of activity and with it an advance, but now that the rush is over values are sliding back to their old level and the whole wire trade is settling back again down to bed rock.

Only the greatest mills, best located, can come out whole at present prices for beams, angles and other structural iron, plates and sheets, hoops and cotton ties, bars and nails, light and girder rails and track and car equipment.

Along the whole line raw material

and labor are squeezed to the lowest notch. Freights are down to a war basis. The pace is being set in some branches by concerns which are in the hands of receivers and who, therefore, seem to pay little attention to interest charges and renewal account.

That such a state of affairs cannot last long will be conceded by every thoughtful buyer. It is merely a question whether the time has arrived to go further than cover immediate requirements. We believe that the conviction is general that there is no danger in further delay. The prospect of months of dullness as the result of the slow progress in Washington is, we believe, the most influential factor in creating this conviction. Yet there are many buyers who acknowledge that they are skating on thin ice. It will not take much to upset the delicately poised balance upon which present low values depend. A modest increase in the demand or a restriction of the supply from the cheap sellers, leaving the market partially to those who must have more money to warrant their starting, must be naturally followed by a stiffening in prices. Against the few possible contingencies which might induce a very slight lowering in values there are so many which would tend toward establishing a reaction that the market needs the very closest watching. We have already witnessed speculative purchases of Bessemer pig iron on quite a respectable scale, and in some departments consumers have succeeded in buying for long delivery at present prices. It does not take very extensive operations of this character to make sellers shy.

Our intercourse with many of the leading men in the trade has led us to believe that very few of them, whether they be manufacturers or consumers, look forward to any marked upward movement in the next two or three months, but they do all agree that there is very little chance of a further decline. Some of them are convinced that covering for requirements well into the fall at present prices is not alone safe, but holds out the promise of making very good interest on the money invested.

Nothing better illustrates the growing dependence of the Eastern iron trade upon the West that the purchase by steel makers in Central and Eastern Pennsylvania of upward of 50,000 tons of Bessemer pig iron during the past three weeks. With freights on pig iron and steel billets equal to like points in Eastern territory, the Eastern steel works are handicapped to the extent of the waste in conversion. To illustrate with an arbitrary example, the rate on pig iron from the Valleys to an Eastern steel works may be assumed to be \$1 on pig iron, and on steel from there to the consumer's mill '70 cents. The direct freight rate from the Western mill to the consumer is, say, \$1.70. The Eastern steel maker must pay freight on an amount of pig iron which includes the waste in con-

version, or say 1.2 tons. His total freight on pig and billets therefore is \$1.20 plus 70 cents, or \$1.90, as against the Western rate of \$1.70. This is based on the assumption that the through freight is not lower than the sum of the tonnage freights of the Eastern mill, which is rarely the case. The true principle, in order to put both works on a basis of equality, would be to accept the "milling in transit" system. In former times this has been done in the barb wire trade for Western points, the raw material being foreign rods, worked in Pennsylvania mills for shipment to the interior.

The Armies of Unemployed.

The organization of unemployed men and tramps into so-called armies to march over the country is an entirely new idea. It will hereafter be referred to in history as originating after the panic of 1893. The movement seemed insignificant at first, and Coxey's march to Washington was regarded as a joke to enliven the columns of the newspapers for a few days and was then expected to pass into utter oblivion. But the events of the last few days have put a much more serious aspect on the situation, and there is promise of enough happening to make future historians inquire closely into the causes, progress and results of this curious manifestation of unrest. At the present time there are some eight or nine "armies" struggling to reach Washington from various parts of the country. Some are moving along, making progress daily, while others are detained by local authorities who are endeavoring to break up their march, and still others are "encamped" and laying siege to railroads in the hope of securing free transportation.

In a numerical sense these "armies" form no special menace to the order and peace of the country. There are too few of them and they are too widely scattered to do much damage. They may cause annoyance to the towns through which they pass, but such towns are but a small part of the country as a whole. As long as the "commonwealers" or "industrials," or whatever they may be termed, are so few in number they can do no particular damage even if some of their leaders indulge in very foolish talk. To their credit it is to be said that they have in the main conducted themselves quietly and as law abiding citizens. But there is danger in their concentration at some point, and rendered desperate by hunger and privation no one can predict what the result might be. The occurrences at Council Bluffs, also, have shown that in large centers of population thousands of men are ready to assist them in attacking and taking possession of railroad property as though it belonged to the people at large. Experience has shown that when there are many workmen idle some join the professional loafers and hoodlums in starting

riots in large cities which cause much destruction to property. The incentive is frequently quite light. The railroad riots of 1877 would not have been so serious and disastrous if the trouble had been confined to those immediately interested. But idle workingmen and the riffraff of cities, always eager for turbulence, took up the cause of the disgruntled railroaders, made common cause with them and carried the conflict far beyond the anticipation of the leaders of the original strikes.

It is unpleasant to contemplate, but there seems to be no attempt by national or State authorities to check this progress to anarchy, and the probable result will be bloodshed. This is our usual course: First, mild interest; next, toleration; next, perplexity; last, conflict and bloodshed.

During the past few years the freight traffic on our lakes has entered a new development which establishes a permanently lower rate on ore, coal and other heavy goods. It has been proven that the modern lake vessel, equipped with the latest boilers and machinery, is capable of earning good money on the investment where the older ships are running behind. In other words, the experience of freight vessels on the ocean is repeating itself, and new tonnage will have to be built, not because additional vessels are required to do the work, but because the old ones cannot be made to pay. This is another striking instance of the enormous destruction of capital as the fruit of technical progress.

Cast Iron Pipe Rates.—The tariff on cast iron pipe which went into effect April 2 on the Queen & Crescent Route has been followed by a second tariff, No. 9, effective April 23. To the more important points the rates are as follows:

To	From	Chattanooga, Tenn.	Birmingham, Ala., and group.
Buffalo, N. Y.		\$3.10	3.60
Chicago, Ill.		2.85	3.10
Cleveland, Ohio.		2.60	3.10
Columbus, Ohio.		2.30	2.80
Detroit, Mich.		2.85	3.10
Indianapolis, Ind.		2.60	2.85
Milwaukee, Wis.		3.30	3.55
Niles, Ohio.		2.85	3.35
Peoria, Ill.		2.85	3.10
Pittsburgh, Pa.		3.10	3.60
Springfield, Ohio.		2.30	2.80
Toledo, Ohio.		2.60	3.10
Youngstown, Ohio.		2.85	3.35

The above rates apply to carload lots of 30,000 pounds.

It is asserted upon good authority that at present prices there is no profit attached to galvanizing steel sheets. Manufacturers are contented, perchance, with a fair profit on the black sheets and go to the trouble of galvanizing in order to find a market for the products of their mills. An effort is being made to get all galvanized iron manufacturers into the Galvanized Iron Manufacturers' Association, for the purpose of maintaining better prices, but there are a few who have not yet signified their intention and independent action continues.

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., April 24, 1894.

The Tariff.

The shifting of the tariff debate from general speeches to the schedules is expected to concentrate the discussion on a line of more direct application to the interests of not only the different branches of industry but of the wage-worker. The main contest is just now directed against the income tax. If party exigencies should cause that item to be eliminated the rest of the bill would naturally be subject to very material revision in order to make up the loss from that source. The conversations of the minority managers of the bill show that they still adhere to the programme of having the fullest discussion of the schedules in all their phases.

The majority are holding conferences every day in hopes of reaching some common ground of harmonious action. If this should be accomplished it will remain to be seen to what extent it will affect the general consideration of the bill.

The organization of the wageworkers and manufacturers throughout the country is having its effect upon certain members of the majority, who begin to think that it is about time to make a halt.

Armor and Ordnance.

The Bureau of Ordnance, Navy Department, has determined to conduct tests of certain 10-inch Harveyed armor plate at the Bethlehem proving grounds in the very near future, instead of having the plates brought to Indian Head for that purpose. The government testing officers from here will conduct the tests, which is expected to save time in conveying the armor here. This plate will be part of the side armor of the battle ship "Indiana," about which there is now some difference of opinion on the question of trial between the Secretary of the Navy and the builder, Mr. Cramp. The latter gentleman is anxious to have the trial of the ship take place without waiting for the rest of the armor, to which the officers of the Inspection Board object. About half of her armor is now on and the remainder is expected to be delivered by June 1. All the heavy armor is being turned out by the Bethlehem Company. The delay has been caused by the difficulty of Harveying. The total shortage of weight, of which armor and turrets are the smallest portion, is 3500 tons, for which the officers are not willing to allow the contractors to substitute lead as ballast. They do not like the precedent and say that the ballast proposed will not take the place of armor. The ship must be fully armored before her trial in order to secure the full results of an actual sea trial.

A very comprehensive tabular exhibit has been prepared at the Bureau of Ordnance, War Department, showing the number of guns required for the defense of the 27 principal ports of the United States fixed by the Board on Fortifications (Endicott Board).

It having been decided not to adopt the 14-inch and 6-inch guns, and to substitute 12-inch for 14-inch and 8-inch for the 6-inch, and not to adopt the 10 inch mortar, but substitute the 12-

inch therefor, the total required becomes as follows:

	16-inch guns.	12-inch guns.	10-inch guns.	8-inch guns.	12-inch mortars.
Total.....	44	239	267	131	824
Commenced.....		42	235	52	80
To be completed June 30, 1894.....		11	26	41	80
Under process of construction June 30, 1894.....		31	29	11	.....
The Bethlehem Iron Company have contracted for.....		25	50	25	.....
Will have completed June 30, 1894.....		1	2	.....	.....

Gun Carriages.

By June 30, 1894, the Ordnance Bureau expect to have completed the following gun carriages:

	Com-menced.	Com-pleted.
8-inch non disappearing.....	8	8
8-inch disappearing.....	1	1
10-inch non disappearing.....	5	..
10-inch disappearing.....	4	4
12-inch non disappearing.....	5	4
12 gun lift.....	4	1
12-inch mortar.....	80	80

The builders of the 12 inch mortar carriages are the Builders' Iron Foundry, Providence, R. I.; Robert Poole & Son Company, Baltimore, and the West Point Foundry Company.

On June 30, 1894, the amount of oil tempered and annealed steel on hand and contracted for will be: Sets of forgings for 31 12 inch, 29 10-inch and 11 8-inch guns.

The army ordnance work of late has been carried on with exceptional vigor at Sandy Hook.

The work on gun carriages for the heavy caliber of seacoast defense guns is beginning to show results. The four types are the 10-inch Buffington-Crozier disappearing carriage, largely operated on the counterpoise principle. This carriage has been completed at the Southwark Foundry & Machine Company, Philadelphia, Pa.

The Gordon 10-inch disappearing carriage, operated on the pneumatic principle, is also going through some important experimental tests. The gun lift carriages for 12-inch guns are on the Abbott principle. This carriage has an automatic arrangement of its hydraulic cylinders to retain the gun in its recoiled position after firing. The last type is the pneumatic disappearing gun carriage operated by compressed air.

The report of Gummey, Spering & Co., Philadelphia, Pa., to Special Agent Ira Ayer of the Treasury Department, respecting their output of tin plates for the quarter ending March 31, 1894, gives the following figures:

Total make tin and terne.....	1,116,320
Tin plates.....	214,296
Terne plates.....	902,034
American black plates.....	898,431
Foreign plates.....	217,899
Tin under 63 lbs. per 100 square feet.....	213,453
Terne plate all under 63 lbs.	

The firm of Gummey, Spering & Co. began making plates early in 1892 and have not stopped except a few days for repairs since then. A particularly gratifying fact in the above report is the great amount of American black plates, more than three-quarters of the total product being of American origin and only 218,000 pounds of foreign plates.

CORRESPONDENCE.

The Hawdon & Howson Furnace.
To the Editor: In your issue of April 19, 1894, you describe the Hawdon & Howson furnace for making pig iron. This arrangement was designed by us in 1880 to use soft coal exclusively, and is patented. See patent No. 228,528, June 8, 1880. TAWS & HARTMAN.
 PHILADELPHIA, PA., April 19, 1894.

OBITUARY.

CHARLES H. ALEXANDER.

Charles H. Alexander died in Philadelphia on the 18th inst. Mr. Alexander was a member of the firm of Alexander Bros., manufacturers of leather belting, 410-412 North Third street. Philadelphia. He was born in 1839 in New Hampshire, and came to Philadelphia in 1868 with his brothers. He was well known in the leather and belting trades, and was a highly respected citizen. At a meeting of the leather and belting trades held at the Harris Club in Philadelphia on the 20th inst., a minute of respect was entered and a committee appointed to attend the funeral service.

WALDEN EDDY.

Walden Eddy died at Greenwich, Washington County, N. Y., April 14. He was the father of many successful enterprises. He established the famous Eddy Plow Works. He was born in South Corinth, N. Y., November 17, 1807. After leaving school he commenced the foundry business, continuing in Corinth until 1835, when he removed to Greenwich, where he embarked in the same line. He entered into a partnership with Martin Dyer, who afterward retired and was succeeded by Abram Reynolds. Samuel Langdon was then admitted as a partner and the firm conducted business under the name of Eddy, Reynolds & Langdon. Later Mr. Eddy bought out his partners, and in 1881 took his sons into partnership.

ALEXANDER H. HOOVEN.

Alexander H. Hooven, for a number of years a member of the firm of James Hooven & Sons, iron manufacturers at Norristown, Pa., died at his home in that city on the 22d inst. of neuralgia of the heart. He was born in 1838 and in 1853 became connected with his father in the rolling mill at Norristown. Subsequently the large blast furnace, afterward leased to McHose & Son, and later the manufacture of iron pipe engaged the attention of the firm. In 1889 he joined with J. P. Masin in establishing the manufacture of washers at Norristown, returning in 1891 to become the superintendent of the works of James Hooven & Sons.

An interesting contention between the Shelby Steel Tube Company of Shelby, Ohio, manufacturers of cold drawn tubes used in bicycle manufacture, and the United States Government was decided by Judge A. J. Ricks in United States Circuit Court, Cleveland, on Monday, April 16. The company named, of which David L. Cockley is president, began importing hollow billets from the island of Sandviken, Sweden, in the fall of 1891. On the first lot imported the question was raised as

to the rate of duty to be paid under the McKinley act. Collector Gary of Cleveland held that the rate should be 1 $\frac{1}{10}$ cents per pound. The importer claimed that the material was dutiable at \$22 a ton, or a difference of about 1 $\frac{1}{10}$ cent per pound. The United States board of general appraisers at New York sustained Collector Gary. An appeal was taken to the United States Circuit Court and Judge Ricks has just decided in favor of the Shelby Steel Tube Company.

The Coal Production of the United States

E. W. Parker, statistician of the United States Geological Survey, has issued the following preliminary statement of the production of coal:

	Product.	Value.
1893.	Short tons.	
Alabama.....	5,138,693	\$5,111,583
Arkansas.....	574,763	773,347
Colorado.....	3,877,526	4,605,939
California.....	72,603	167,565
Georgia.....	372,740	365,972
Illinois.....	19,949,584	17,827,595
Indiana.....	3,721,751	3,977,425
Indian Territory	1,252,110	2,148,637
Iowa.....	3,931,026	5,072,763
Kansas.....	2,553,641	3,184,650
Kentucky.....	3,005,010	2,610,973
Maryland.....	3,651,631	8,209,719
Michigan.....	45,979	82,462
Missouri.....	2,897,423	3,560,599
Montana.....	913,460	1,836,073
New Mexico.....	601,145	948,248
North Carolina.....	17,000	25,500
North Dakota.....	49,590	56,150
Ohio.....	13,140,770	12,253,794
Oregon.....	41,683	184,500
Pennsylvania.....	44,098,053	35,208,473
Tennessee.....	1,908,974	2,057,977
Texas.....	302,136	688,267
Utah.....	413,205	611,092
Virginia.....	813,568	834,623
Washington.....	1,264,877	2,920,876
West Virginia.....	10,619,985	8,225,312
Wyoming.....	2,439,311	3,290,904
* Total bituminous.		\$121,671,009
Pennsylvania anthra-		
cite.....	53,950,400	85,684,465
Totals.....		\$207,355,474

* Includes small anthracite production of Colorado, New Mexico and Virginia.

The figures quoted above include an allowance for country banks. The returns differ materially from the estimate made by the *Engineering and Mining Journal*, which was 850,000 tons too high for Indiana, 1,000,000 tons too low for Illinois, 500,000 tons too high for Kansas, 400,000 tons too high for Missouri, 1,400,000 tons too high for Ohio, over 1,000,000 tons too high for Pennsylvania bituminous coal and about 1,750,000 too low for West Virginia.

The Stability Board, composed of several of the ablest officers in the navy, have filed their report upon the battle ship "Indiana" and her sister vessel. The report completely vindicates the design of the ships, and shows that the great weight of armor and armament can be carried by them with ease. With only 10,000 tons displacement the "Indiana" has a battery equivalent to that of the great 14,000-ton ships now building for Great Britain, and she is a more formidable vessel than any of her size in the world. The metacentric height, measuring the stability of the ship, was found by actual tests to be within an inch of what was intended when the design was made, or 3 feet 4 $\frac{1}{2}$ inches. It is said that the accuracy of the calculations made has been verified in a most remarkable degree, the board demonstrating that the vessel draws exactly 24 feet, as it was designed to do, and that with 400 tons of coal aboard the total weights differ from the estimated by only two-thirds of 1 per cent. The

result is naturally very gratifying to the Department and to the public in general.

PERSONAL.

A. J. Forbes-Leith of the Illinois Steel Company has returned to Europe.

Eckley B. Coxe is spoken of as a Democratic candidate for the Governorship of Pennsylvania. Should he allow his name to be put forward, Mr. Coxe would, says the Harrisburg *Patriot*, reunite and strengthen the Democratic party as few other men in the State could.

Lieutenant Naoki Miyaoka of the Imperial Japanese Navy, temporarily attached to the Japanese Legation, is in this country for the purpose of studying American methods in the construction of war ships and armor plates, with the object of using his information for the benefit of the new Japanese Navy. Lieutenant Miyaoka was at Bethlehem, Pa., last week, where he inspected the armor plate and gun works. The Japanese Navy, he stated, consists at present of 40 efficient war vessels, and plans are shortly to be drawn for the construction of two battle ships of the "Indiana" and "Massachusetts" type.

The demoralization in the cast iron car wheel trade is well illustrated by the fact that some car wheel manufacturers are offering railroads to furnish them with a new wheel for each two old wheels delivered to them. Since old wheels are offered to car wheel makers openly at \$9 per ton, the low prices which are made on new stock may be readily figured.

The labor troubles in the Chicago building trades are now in promising shape for early settlement. Some of the leaders in the lockout by employers are changing their attitude and propose to resume work on partly completed buildings. Their differences with their workmen are gradually disappearing. Concessions are being made by both sides. The most stubborn fight appears to be among the plumbers, as the journeymen positively refuse to accept the terms offered by the master plumbers. The latter are endeavoring to resume operations with non-union workmen drawn from outside points. Everybody is hopeful, however, that the struggle between the plumbers will not be protracted, but that the difficulty may be arbitrated. An unfortunate effect of this controversy has been the indefinite postponement of many building enterprises projected this spring in Chicago.

The Pittsburgh Sales Agency, J. H. Hillman, manager, 8 Wood street, Pittsburgh, Pa., announce that they have for sale at very low prices Bessemer steel works, structural steel mills, also steel plant for rolling bars and cold rolling, and an interest in a tin plate plant located in Indiana. The further announcement is made that this agency have for sale some very desirable coal properties, improved and unimproved.

Earl C. Bacon, formerly of the firm of Copeland & Bacon, New York, has located in the Havemeyer Building as an expert consulting and erecting engineer.

MANUFACTURING.

Iron and Steel.

At this time Furnace No. 1 is the only stack in operation at the plant of the Pennsylvania Steel Company, Steelton, Pa. The other three stacks are undergoing repairs.

Last week a serious explosion occurred at Furnace D at the Edgar Thomson Works, Bessemer, Pa., entailing a loss of about \$25,000. The stack will be idle some time while necessary repairs are being made.

Last week every department of the plant of the Brown, Bonnell Iron Company, Youngstown, Ohio, with the exception of No. 1 mill, was in operation. It is stated that this firm have secured quite a number of large orders, and expect to operate their plant to fuller capacity from now on than has been the case for some time past.

Work is being rapidly pushed on the tin mills at the Etna-Standard plant, Bridgeport, Ohio. The machinery has commenced to arrive and it is expected that operations will be commenced in from 60 to 90 days. The first mills built will be experimental, and if the venture proves successful several more will follow. The old puddling department of the Standard plant has been entirely cleared and the building will be used as a tinning house. This arrangement concentrates the tin plate operations, as the tin mills are being erected where the Etna plate mill formerly stood, directly opposite the Standard puddling department. Many other improvements are going on at this already extensive plant, and an increase in the capacity of the galvanizing shop is under consideration. During the past few weeks the Etna-Standard mills have been operated more steadily than at any time since work was resumed last fall.

The Penn Iron & Coal Company, Canal Dover, Ohio, are contemplating making considerable improvement in their blast furnace.

The implement manufacturers of Moline, Ill., are discussing the expediency of erecting a rolling mill there to supply the several establishments with a large part of the material now purchased from mills at a distance.

The Muncie Iron & Steel Company have started their new merchant mill at Muncie, Ind.

It is understood that the rolling mill of the Ohio Steel Company now building at Youngstown, Ohio, will be arranged so that steel rails as well as billets can be made.

Fruitless efforts have been made to induce the Racine Malleable Iron Company to remove to other localities, but they have decided to remain at Racine, Wis., and will rebuild the plant which was recently destroyed by fire.

The machinery for the new plant of the Minneapolis Iron Rolling Mill Company, according to a local paper, has been tied up at Pittsburgh awaiting orders for its shipment, which will not be given until the iron market picks up sufficiently to warrant the starting of the mill. If this should come within two weeks, it is thought the mill can be started June 1. At first its chief work will be the reduction of scrap iron to commercial bar, after which a car axle and link and pin plant will be put in.

Receiver Robert Kelly expects to be able to put in operation the plant of the West Superior Iron & Steel Company, at West Superior, Wis.

The rolling mill department of the Duluth Mfg. Company, at Duluth, Minn., will be started up shortly with the usual number of hands. The company are receiving orders for rolled iron and the mills will be put to work to make up stock for the general market. How long the plant runs will be determined by the amount of orders secured.

The building now under erection by the Canton Rolling Mill Company, Canton, Ohio, is rapidly approaching completion, and is expected to be finished about July 1 next. The new concern will engage in the manufacture of iron and steel sheets and expect to turn out from 25 to 35 tons per day. The building is of iron and is being erected by the Canton Bridge Company of Canton, Ohio. The rolls are being furnished by the Lloyd Booth Company of Youngstown, while Wm. Tod & Co. of the same place will supply the engine, and Reeves Brothers of Alliance, Ohio, have the contract for the boilers.

The Falcon Iron & Nail Company of Niles, Ohio, have filed a petition in the Common Pleas Court, at Trumbull, Ohio, to enjoin the City Council of Niles from issuing \$10,000 worth of bonds for establishing a new sheet mill.

At a meeting of citizens of Blairsville, Pa., held in that place last week, it was decided to take up the question of building a tin plate plant. The new concern will be known as the Pennsylvania Rolling Mill & Tin Plate Company, the authorized capital stock to be \$250,000, divided into 5000 shares, having a par value of \$50 per share. A committee was appointed to perfect the necessary arrangements looking to the erection of the plant.

The Linden Steel Company of Pittsburgh, manufacturers of open hearth and Bessemer steel, are running their plant to nearly full capacity. Their sheet mill, 10-inch mill, machine and blacksmith shops are running double turn.

A meeting of stockholders of the Oliver Iron & Steel Company was held in Pittsburgh last week for the purpose of considering an increase of the capital stock of the concern and to make an issue of preferred stock.

Claire Furnace of the Claire Furnace Company, Limited, at Sharpsville, Pa., was put in blast last week after an idleness of some months.

The entire plant of the Lockhart Iron & Steel Company, at McKees Rocks, Pittsburgh, manufacturers of merchant bar iron and steel, is in operation to full capacity.

All departments of the plant of the Keystone Rolling Mill Company of Pittsburgh, manufacturers of iron and steel skelp, are in full operation, with the exception of the plate mill.

The men employed in the bar mill of A. M. Byers & Co., at Pittsburgh, have accepted a reduction of 10 per cent. in wages.

The latest report in regard to the rolling mills operated for a short time a few years ago by the Joliet Sheet Steel Rolling Mill Company, Joliet, Ill., is to the effect that the property has been sold to Jacob James of New Castle, Pa., formerly manager of the Arethusa Iron Works, and his brother Henry James of Cleveland, Ohio; the consideration being less than one-half the cost of the plant.

Men are at work preparing for the erection of new buildings for the Whitaker Iron & Steel Company, Wheeling, W. Va., and material has commenced to arrive. The report that N. E. Whitaker will engage in the manufacture of tin plate at Washington, Pa., is not yet an assured fact. The project depends upon the settlement of some very important negotiations now pending.

The semi-monthly pay roll at the Pennsylvania Steel Company's Works, Steelton, Pa., amounted on Saturday last to \$61,000, the largest in many months.

The 14 and 20 inch trains in the merchant mill of the works of the Burden Iron Company, at Troy, N. Y., were idle last week. The new horseshoe department is in operation, as well as two machines in the old department.

The puddlers at the Albany Iron Works, Troy, N. Y., started to work last week, and they had only been engaged a few hours when they were obliged to cease on account of a break in the big iron pipe leading to the tank which furnishes the supply to the mill. Repairs were speedily made, however, and operations were resumed.

Suits to foreclose mortgages amounting to \$132,000 against the Maumee Rolling Mill Company and John E. Mosher of Toledo, Ohio, have been brought by James Secor and Thomas H. Walbridge, trustees.

The rolling mill of the Logan Iron & Steel Company at Lewistown, Pa., has been burned.

The Columbia Rolling Mill Company, Columbia, Pa., recently resumed work with 200 hands after some months' idleness. A few days later when a reduction of 25 cents a ton for puddling was announced, bringing wages down to \$2.50 a ton, the men struck and the mill was again idle.

Part of the works of the Marshallton Iron Company, at Marshallton, Del., have started up.

Topton furnace, at Topton, Berks County, Pa., will be blown out about May 1 and sold, in order to settle the estate of the late Henry S. Eckert, who was a partner with his son, Isaac Eckert, in the management of the plant. The furnace has been a suc-

cessful one, but will, it is said, require extensive repairs before relighting.

No 2 Sheridan furnace, Wm. M. Kaufman & Co., Sheridan, Pa., is being relined, and will probably be blown in about the middle of next month. Other improvements are also under way about the plant.

The Ontario rolling mills, at Hamilton, Ont., have started up in full, with the prospect of a continuous run.

We are advised by E. D. Reis, manager, that the report that the Rosenau furnace at New Castle, Pa., had blown out for the purpose of relining is erroneous. The furnace was coked down on account of a strike, but will start up again during the present week.

The E. & G. Brooke Iron Company of Birdsboro, Pa., have posted a notice of a 10 per cent. reduction in their nail works, taking effect May 1.

The plant of the W. Dewees Wood Company, at McKeesport, Pa., has shut down indefinitely.

The plate mill of Potts Bros. Iron Company, Limited, Pottstown, Pa., has started up. It is stated that sufficient orders are on hand to keep the mill busy for some time to come.

The workmen of the Northeast Works of the McCullough Iron Company, Northeast, Cecil County, Md., went on strike because they were dissatisfied with the wages they were receiving, but when told that the works would be closed indefinitely they accepted the old rate and returned to work.

The Dora Furnace Company at Pulaski, Va., are erecting a brick foundry, 40 x 100 feet in size. The foundry will utilize a portion of the furnace product.

The Benwood, Ohio, plant of the Wheeling Steel & Iron Company has been equipped for the manufacture of steel skelp.

The plant of the Brown, Bonnell Iron Company, Youngstown, Ohio, which was in full operation last week, will be idle in some departments during this week. On Monday, the 23d inst. this firm commenced to reline Phoenix furnace preparatory to putting it in blast.

Machinery.

The Chicago Great Western Railway Company have decided to establish their machine shops at Oelwein, Iowa. The magnitude of the shops can be estimated from the fact that a land company will expend \$200,000 in their erection to induce the company to locate at that point.

J. W. Vaness has made arrangements to build a foundry and machine shop at Albert Lea, Minn.

Charles J. Newcomb has purchased the old Ogden plow works plant at Cedar Rapids, Iowa, and removed thither his foundry and machine shop from Parnell, Iowa. A portion of the establishment he has rented to J. Mullin, lately of Minneapolis, who will manufacture boilers.

The effects of the late Rice & Whitacre Mfg. Company, 47 South Canal street, Chicago, have been purchased by the Rice Engine & Boiler Company, who will continue the business of manufacturing engines, boilers, &c.

The Rice Machinery Company, 168 South Clinton street, Chicago, are offering the trade packing of various kinds, of braided flax and with gum core. Their braided flax packing is branded with an arrow and is used more particularly for water pumps and hydraulic elevators, but is also a good steam packing. Their Red Cross piston packing is made with both round and oval core. Their Skull and Bones steam piston packing has been made to fill a demand from engineers for the best packing that can be produced without regard to cost, and is made of the best cotton fiber on a round rubber core. The company also offer asbestos cold water paint for whitening walls and ceilings in factories, warehouses, sheds, &c., which is put up in powder form and is ready for instant use by simply mixing with cold water.

The Dodge Mfg. Company have just opened an Eastern branch at 43 and 45 Dey street, New York, for the sale of their power-transmission machinery. Their Chicago branch is located at 166 to 174 South Clinton street. It is their intention to carry in these two warehouses the largest stock of shafting, hangers and wood split pulleys to be found in any house in the same line of trade. It will be remembered that this company secured the contract for supplying the late World's Fair at Chicago with shafting, hangers and wood split pulleys,

the outfit calling for some 400,000 pounds of material. They are preparing and now have in press a new catalogue. It will be ready for distribution about the middle of May. The company's works and main office are at Mishawaka, Ind.

Hon Lewis Miller of Akron, president of C. Aultman & Co., Canton, Ohio, manufacturers of agricultural machinery, which concern went into the hands of a receiver some months since, has made a proposition to the creditors of that firm and a similar one to the creditors of the Akron Iron Company, Akron, Ohio, of which concern Mr. Miller is also president, and being the principal endorser for both companies. He proposes to assign to the Savings & Trust Company of Cleveland, Ohio, in trust for creditors of C. Aultman & Co., \$319,000 worth of stocks and securities owned by him in Aultman, Miller & Co.; in Akron, Whitman & Barnes Mfg. Company; First National Bank of Canton, and other corporations, to be held in trust for three years. If the indebtedness of C. Aultman & Co. is not satisfied at the expiration of that time, the securities to be sold in Cleveland by the creditors' committee for the benefit of the creditors of C. Aultman & Co. In the mean time Mr. Miller asks \$5000 a year in dividends from these securities. His proposition to the creditors of the Akron Iron Company, which is in the hands of J. A. Long as receiver, is to assign in trust \$150,000 in stock and real estate on like conditions to the above. From these he asks that he receive \$200 of each year's dividends. The assets of C. Aultman & Co. when the receiver took charge were \$1,90,000 and the liabilities about \$1,500,000. The proposition of Mr. Miller has been favorably received by a number of leading creditors, and it is believed that it will go into effect, thus facilitating a reorganization of both concerns.

The Enterprise Mfg. Company, Columbiana, Ohio, have just completed the erection of a 15-ton steam street roller which has been given a partial trial with very satisfactory results. The firm claim a number of improvements in this roller, one of the most important of which is the steam steering device.

Located at Washington, Pa., are a number of concerns engaged in the manufacture and sale of boilers and oil well supplies in general. A recent visit to that place showed that these concerns were all enjoying a fair trade and were operating their plants to nearly full capacity. Davin & McClure, manufacturers of oil well supplies of all kinds, are running to nearly full capacity. The same is true of the Petroleum Iron Company, whose specialty is the manufacture of oil well boilers. Fink, Lane & Fink, manufacturers of oil well supplies, are also employed to nearly full capacity, as is Geo. W. Rose, whose machine shops were recently burned down but have been rebuilt on a larger scale.

The Hall Signal Company of Maine filed a bill in equity in the United States Circuit Court at Pittsburgh last week against the Union Switch & Signal Company of that city. It is alleged the defendant company have been using a certain circuit controlling a device for which the plaintiff holds the sole right by purchase from the inventor, J. P. Buchanan. An injunction and damages are asked for.

William Sleicher, Jr., of the Troy Malleable Iron Company, Troy, N. Y., has leased the Daniel E. Paris Foundry at West Troy, N. Y. He intends to utilize the foundry for the manufacture of iron specialties. He has begun repairs and hopes to have them completed so that he may commence operations in about three weeks. The Standard Scale Company, now located at Kingston, N. Y., will occupy a portion of the plant. The Paris Foundry has been idle about a year.

The Chicago branch of Henry R. Worthington, manufacturer of the Worthington steam pumps, condensers and water meters, has been removed from the corner of Lake and Dearborn streets to 185 to 189 Van Buren street.

The Cincinnati Milling Machine Company, Cincinnati, Ohio, refer to the condition of business with them as being fairly satisfactory. They are now running on full time. They have received so far this month four cable orders for millers and grinders.

The Laidlaw-Dunn-Gordon Company, at Tweedvale, 9 miles from Cincinnati, just beyond Ivorydale, have started work on their new shop. The present plant of the company in Cincinnati is to be removed to

the new suburb, as is also the Gordon Pump Works at Hamilton, Ohio. The main machine shop will be the first building erected. It is to be 600 feet long and 113 feet wide and 65 feet of one end is to be three stories high. It will cost \$120,000. East of this main building will be the iron foundry, pattern shop, brass foundry, blacksmith shop, &c. The total cost of the plant, with residences, will be \$700,000. It is expected that \$300,000 will be spent this spring.

The workmen employed by the Phoenix Iron Company of Trenton, N. J., have applied to the court for the appointment of a receiver of the company, alleging that wages amounting to \$2000 are due them.

John L. Bogart, who manufactured turret machines, lathes, milling machines and special machinery at Flushing, L. I., has closed his works indefinitely.

The A. A. Griffing Iron Works of Jersey City, N. J., have shut down, anticipating a strike by their 250 employees, who demanded the restoration of a reduction of 10 to 20 per cent. in wages made last December.

After an idleness of five months the North Reading Foundry, at Reading, Pa., have started up in full, employing 160 hands.

Chambers Bros. & Co., Philadelphia, will erect a one-story steel and brick foundry building, 80 x 50 feet in size, at Fifty-second and Media streets.

The Cordele, Ga., machine shops and planing mill have been burned at a loss of \$30,000.

The loss sustained by the burning of the cast iron pipe works of the Glamorgan Company, at Lynchburg, Va., is now placed at \$100,000, the insurance being \$65,000. Nine buildings were destroyed, including the foundry and machine shop. The fire is supposed to have originated in the cupola of the foundry. The works will be rebuilt with all possible haste, it being the intention to erect more substantial structures than the ones burned.

The Williamsport Valve & Hydrant Company of Williamsport, Pa., have just entered upon their second year of establishment, and are meeting with a good demand for their products. Their valves are of the straightway pattern, with double gate and parallel seat. The wedging parts are constructed in such a manner as to insure a very quick release and a consequent removal of strain from the spindle. They are described as working well in any position, upright, upside down or flat, an important feature in heavy valves. The spindles and bearings in all valves are of brass, and on screw socket valves 8-inch and larger companion flanges are used. The company state that it is not their intention to compete in price with cheap goods, but they will aim to produce a first-class valve, embodying high quality of material and workmanship, at as reasonable a figure as possible. The valves are made, under patents owned by the company, in brass from $\frac{1}{4}$ inch to 3 inches and in iron 2 inches upward. The company's plant is conveniently located in a well lighted new brick building situated on the outskirts of the city of Williamsport, and sidings from the Pennsylvania and Philadelphia & Reading railroads run into the works. Their foundry is 45 x 60 feet and their machine and finishing shop 45 x 128 feet, while their engine and boiler room, pattern and store rooms are of ample size and well arranged. Their site covers 4 acres, and the sand used in their foundry is found on their property in inexhaustible quantity. Their machinery is of the newest type and selected especially for their class of work. They furnish employment for about 50 hands at present, but state that they are augmenting their force almost weekly. They are about to commence the erection of an extension to their main building, 45 x 100 feet, to be used as a stock room.

E. D. Jones, Son & Co. of Pittsfield, Mass., will erect a new machine shop. The structure will be about 100 feet long and three stories high.

The Tamaqua Mfg. Company of Tamaqua, Pa., are about to move their plant to a new site not far from their present location. They will commence the erection of a frame building on the new site very shortly, to contain the foundry, machine shop and office. They will utilize their present foundry building as soon as it can be removed to the new site as a blacksmith shop and cleaning room. They will add considerably to the equipment of their machine shop, and will put a new cupola

and crane in their foundry. The company make a specialty of the manufacture of coal mining machinery.

Hardware.

The Reliable Edge Tool Works of Indianapolis, Ind., are preparing to build new works on a more extensive scale.

A six-story building is being erected on Wormwood street, South Boston, Mass., by the Boston Ferrule Company. The building will be constructed of brick. It will be 75 x 200 feet.

The Wright & Colton Wire Cloth Company, Worcester, Mass., are now running from 240 to 250 hands in all departments, and operating nearly all departments night and day, turning out some \$700 worth of goods daily and having a weekly pay roll of nearly \$2000. The erection of a 25 x 65 foot two story addition to the galvanizing plant will be commenced soon. The wire mill department is now turning out something like 200 tons of wire per month.

Buffalo Tricycle Company, Buffalo, N. Y., write us that their business is fully up to that of last year for the same period. They state that their goods are being very favorably received, referring to the fact that there is a large demand for a first-class, fully guaranteed, high grade, medium priced bicycle. They are still making large quantities of tricycles.

Hubbard & Co., Pittsburgh, Pa., manufacturers of shovels, spades, scoops and drain tools, advise us that trade with them is in a very satisfactory condition. During the last six months this concern have operated their entire plant to full capacity. They report a specially large demand for their oil tempered railroad shovels, which are said to be in use by railroads all over the United States.

At the annual meeting of the stockholders of the Yale & Towne Mfg. Company, held on April 19 at the company's office at Stamford, Conn., the following gentlemen were re-elected directors for the ensuing year: Henry R. Towne, Schuyler Merritt, George E. White, M. F. Merritt, Walton Ferguson and Wm. F. Donovan, all of Stamford, and Thos. F. Keating of New York. At a subsequent meeting of the directors the following officers were elected: Henry R. Towne, president; Schuyler Merritt, secretary; George E. White, treasurer; Thos. F. Keating, assistant treasurer; William F. Donovan, general manager.

The Champion Self-Heating Flatiron Company of Kansas City, Kan., and Kansas City, Mo., have been incorporated with a capital of \$250,000. The directors are R. E. Ela, C. I. Lee and W. A. Griswold of Kansas City, Kan., and S. W. Dowling, J. O. R. Campbell, N. W. Brandon and A. G. Brandon, of Kansas City, Mo.

The Brady Edge Tool Works, Lancaster, Pa., which have been running for several months on short time, began on the 23d inst. to work full time, ten hours per day, with a full force of men.

The William Lang Company, 123-139 Middleton street, Brooklyn, N. Y., have reorganized and strengthened themselves by taking in several individuals long connected with the E. P. Gleason Mfg. Company, including E. F. Gennert, formerly second vice-president, and superintendent F. W. Belmont, secretary, and J. F. Cunningham, assistant superintendent, all of whom have been with the above named concern for many years. The Lang Company are manufacturing gas and electric supplies, machine made fittings and trimmings, including argand and gas burners, electric and gas sockets, holders and a general line of parts for concerns manufacturing electric and gas fixtures.

Miscellaneous.

The employees of the Passaic Zinc Works, at Jersey City, N. J., have been notified that the 10 per cent. reduction taken from their wages last December will be restored to them on May 1.

Among recently authorized corporations in Illinois is the Illinois Reaping & Mowing Machine Company, at Chicago; capital stock, \$300,000; incorporators, George E. Shipman, Daniel Lauterman and John J. Kelly. Winslow Brothers Elevator Company, at Chicago; capital stock, \$100,000; incorporators, Francis A. Winslow, Edward O. Brown and George Packard.

In the courts at Pittsburgh this week, Mackintosh, Hemphill & Co., Limited, of that city, secured a verdict for \$6585.10 against Charles H. Reed, an action on a note.

The Iron and Metal Trades.

The labor troubles are the principal element of uncertainty in the situation at the present writing. The general strike of the Bituminous Coal miners affects the finishing mills chiefly by cutting off their supply of fuel for the heating furnaces and in some cases for the boilers. The railroads are apparently seizing promptly the consignments of fuel to their customers and withhold the Coal for their own use.

The miners in the Connellsville region seem to be carried along by the general movement, and the situation there is regarded as more serious, from the standpoint of a supply of Coke for the near future, than it has been thus far. Any stoppage even though it be brief would quickly tell on the furnaces and Steel works of the Central West because old stocks of Coke have been very much reduced during the recent troubles. Any unfilled orders which might be thrown upon the market by customers of the Western mills could be readily taken care of by the Eastern works at a price.

The strike in Alabama would influence quite different interests if established and continued. It would touch the founders throughout the country. As yet all the furnaces in the Birmingham district are running and the chances seem to be against the men, many of whom recognize that since there has been no change in wages in the last five years, in spite of the enormous shrinkage in the price of Pig Iron, a reduction is a necessity.

A lull has followed the very large purchases of Bessemer Pig Iron in the West, which had left the market stationary until fears of a coke strike began to create some uneasiness. Billets are firmer and are held at \$15.75, Pittsburgh, for the lowest sellers. Buyers, however, are pretty well covered for the present.

There seems little doubt that, generally speaking, the mills in the Pittsburgh and outlying districts are not as eager sellers as they have been. The result is that, with relaxing pressure from that quarter, the Eastern mills are picking up more business. Prices, however, continue at the very lowest notch.

One of the interesting transactions of the past week has been the closing of an 85-mile Wrought Iron Pipe contract for the natural gas belt at Lafayette, Ind. A works on the Delaware River has captured the lion's share of the order, from 50 to 55 miles, while the balance is taken by Pittsburgh. Eastern Pennsylvania mills are to furnish the material for that part of the order which goes to their section.

Chicago reports that the local Steel Rail mills have orders assuring work well into fall. From St. Louis comes the announcement that a 10,000-ton order was placed there.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, Chicago, April 25, 1894.

General business is still halting. A few branches show some improvement, but they are in marked contrast to the dullness prevailing in other lines. Considerable apprehension prevails regarding the possible effect of the Coal miners' strike which now prevails throughout the greater portion of the central West. While the strike is not universal, it is nevertheless of such huge proportions that it bids fair to paralyze trade if it continues for any considerable length of time.

Pig Iron.—The trade in local Coke Irons has latterly been confined to car-load orders almost entirely, but they have been fairly numerous. Advices received from the Southern furnace companies state that they are very much disturbed over the strike among the Coal miners. The Alabama furnaces are more affected than the Tennessee. Agents are notified to be careful in making contracts for future delivery, as the manufacturers may not be in a position to fill them. Consumers, however, are not buying much at present, so that the strike in the South will hardly cause much annoyance in this section. Prices thus far have not been affected. The greater part of the trade now occurring is with country customers, as the city foundry trade has been decidedly curtailed by the local building troubles. Lake Superior Charcoal continues very quiet. Quotations are given as follows for cash:

Lake Superior Charcoal.....	\$15.00 @ \$15.50
Local Coke Foundry, No. 1...	11.25 @ 11.50
Local Coke Foundry, No. 2...	10.50 @ 11.00
Local Coke Foundry, No. 3...	10.00 @ 10.50
Local Scotch.....	11.50 @ 11.75
Ohio Strong Softeners No. 1...	12.60 @ 13.50
Southern Silvery, No. 1.....	.... @ 11.50
Southern Silvery, No. 2.....	.... @ 11.00
Southern Coke, No. 2.....	10.00 @ 10.35
Southern Coke, No. 3.....	9.75 @ 10.00
Southern, No. 1. Soft.....	10.25 @ 10.50
Southern, No. 2. Soft.....	9.75 @ 10.00
Tennessee Charcoal, No. 1...	15.00 @ 15.50
Tennessee Charcoal, No. 2...	14.50 @ 15.00
Alabama Car Wheel.....	17.85 @ 18.00
Jackson County Silvery.....	15.00 @ 16.00
Other Ohio Silvery.....	12.50 @ 13.00
Coke Bessemer.....	12.00 @

Bars.—Bar Iron has taken another dip downward and mill shipments can now be quoted at 1¢ @ 1.10¢, Chicago delivery. The reduction in price is not stimulating consumption and orders during the week have been small and far apart. Inquiries are light, so that but little business is in sight. Manufacturers are of the opinion that the annual midsummer suspension of work will occur much earlier than usual this year. It would not be surprising to hear at any early day of the closing of a considerable number of rolling mills, partly because of a lack of orders and partly because prices are too low to enable the makers to get out whole. Consumers are now discriminating against so-called Soft Steel Bars of Scrap Steel, which prove very unsatisfactory in any work requiring forging or machine work. They are insisting on Bars made from Billet stock, and our quotations are therefore made for the better class of material. Manufacturers quote for such Bars 1.20¢ @ 1.25¢, Chicago, for mill shipments. Jobbers have had a somewhat better trade the past week, but it is of a spasmodic character and they are hardly encouraged sufficiently to report an improvement in business.

They quote small lots of Bar Iron from stock at 1.20¢ upward and Soft Steel Bars at 1.30¢ upward, according to quantity.

Structural Material.—The city demand continues very small, as building troubles are not yet ended. The trade with outside localities keeps up well, and some of the city yards are very busy in getting out country orders, which, though small, are so numerous as to aggregate an excellent volume of business. Prices on Beams have now reacted slightly and are not quoted at the very low rates recently prevalent. Quotations on mill shipments, Chicago delivery, are as follows: Beams and Channels, 1.35¢ @ 1.40¢; Tees, 1.50¢ @ 1.60¢; Angles, 1.30¢ @ 1.40¢; Universal Plates, 1.30¢ @ 1.35¢. Small lots of Beams from stock are selling at 1.50¢ @ 1.60¢ per 100 lb.

Plates.—A change has come over the Plate market which may or may not be significant. Several of the most important concerns have withdrawn from the market or else advanced their prices, which has the same effect. Dealers are experiencing no improvement in the demand for small lots from stock. Mill shipments, Chicago delivery, may be quoted as follows: Tank Steel, 1.35¢ @ 1.40¢; Flange Steel, 1.60¢ @ 2.10¢; Fire Box, 2¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.80¢ @ 1.90¢; Tank Steel, 1.60¢ @ 1.85¢; Flange Steel, 2.10¢ @ 2.35¢; Boiler Tubes, 75 % off.

Sheets.—Trade in Black Sheets continues good and prices are not perhaps quite so low as they have been. Manufacturers of best brands have refused to meet the quotations on inferior grades and are at last entering contracts at their own figures. Good quality No. 27 Common Iron is selling at 2.35¢ @ 2.40¢ for mill shipment, Chicago delivery. Small lots are quoted at 2.70¢. Galvanized Iron is in fairly good demand, with manufacturers quoting mill shipments at 77½ and 80 % off, Chicago delivery. Small lots from stock are selling at 75 and 10 % to 77½ %, according to quantity. Sheet Copper continues to be held at 14¢ base, with no discount.

Merchant Steel.—Business in this line has latterly been quiet. We quote mill shipments, Chicago delivery: Smooth Finished Machinery and Tire, 1.70¢ @ 1.80¢; Open Hearth Spring Steel, 1.85¢ @ 1.90¢; Bessemer Machinery, 1.55¢ @ 1.60¢; Bessemer Tire, 1.40¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

Billets and Rods.—Inquiries are reported for upward of 6000 tons of Steel Billets, but for deliveries which the local manufacturers were unable to make. They quote on future business nominally \$17 @ \$17.25. Prospects are improving for contracts for Wire Rods for future delivery, and prices are firmly held at \$26.50.

Rails and Track Supplies.—A much better inquiry for Steel Rails has developed of late, and some very good projects are taking shape which will require considerable quantities. The local mills are now assured a steady run until well into the fall, contracts already booked covering the next three months, running at a moderate rate. Quotations are \$25 @ \$27 for standard sections of Steel Rails; 1.25¢ @ 1.40¢ for Splice Bars; 2.30¢ for Track Bolts with Hexagon Nuts, and 1.70¢ @ 1.80¢ for Spikes.

Old Rails and Wheels.—In the absence of transactions in Old Iron Rails, quotations are nominally \$10 @ \$10.50. Long lengths of Old Steel Rails are quoted \$9.50 @ \$10, and a sale is re-

ported of Frogs and Guards at \$6.60. Old Car Wheels are stagnant, with quotations nominally \$10 @ \$10.50.

Scrap.—The demand for Old Material seems to get lighter with the progress of the season. The local mills are buying very little, as some of them anticipate an early stoppage of operations. Dealers quote the following prices $\frac{\$}{t}$ net ton: Forge Scrap at \$8 @ \$8.50; selected Heavy Cast at \$8 and selected Mill at \$7. These prices vary somewhat from quotations made by dealers in a regular way. They quote the following selling prices $\frac{\$}{t}$ net ton: Railroad Forge, \$9; Dealers' Forge, \$8 @ \$8.50; No. 1 Mill, \$6.50; Pipes and Flues, \$6; Heavy Cast, \$7 @ \$7.50; Stove Plate, \$5 @ \$5.50; Fish Plates, \$10; Horseshoes, \$9; Mixed Steel, gross ton, \$5.

Metals.—Carload lots of Lake Copper are unchanged at 10¢. Casting Copper is quoted at 9 $\frac{1}{4}$, but the market is by no means firm. Spelter is weak at 3.30¢ @ 3.35¢. Prices are now considered so low that dealers are advising their customers to lay in stocks. Pig Lead has been quite dull since our last report, and carload lots are quoted at 3.25¢ @ 3.30¢.

John McLauchlan, manager of the Western office of the Andrews Brothers Company, has removed from 59 Dearborn street to the New York Life Building, corner Monroe and La Salle streets, Chicago. The Andrews Brothers Company are manufacturers of Bars, Bands, Hoops and Sheets of Iron or Steel and Hasletton Scotch Pig Iron.

Backman, Forsyth & Co., Pig Iron and Coke commission merchants, have removed from The Rookery to room 910 Medinah Temple, corner of Jackson street and Fifth avenue, Chicago.

The Manufacturers & Merchants' Warehouse Company, 10 to 24 West Water street, have been appointed sales agents for the New Philadelphia (Ohio) Iron & Steel Company, manufacturers of Black, Cold Rolled, Pickled and Galvanized Sheets, and will represent this company in Chicago and the West.

Louisville.

LOUISVILLE, Ky., April 23, 1894.

There continues to be a fair amount of selling, but prices have not improved. The largest sale was between 2000 and 3000 tons. Prices were made for long deliveries as low as \$6.75, Birmingham, for No. 2 Foundry, and other grades in proportion. Buyers appreciate the extreme low offerings, in that they are trying to purchase for fall delivery upon this basis. Whether furnaces will decide that it is wise to sell so far ahead has not yet been determined. Among Pipe shops there is a large number of orders for finished product being placed, but no change in prices, sales being effected on a basis in which every concession is made in favor of the buyer, leaving no profit to the producer. Among car companies they report scarcely any work in sight, even at present prices. We quote for cash, f.o.b. cars Louisville, Ky.:

Southern Coke, No. 1 Foundry... \$10.25 @ \$10.50
 Southern Coke, No. 2 Foundry... 8.75 @ 9.25
 Southern Coke, No. 3 Foundry... 8.50 @ 8.75
 Southern Coke, Gray Forge... 8.00 @ 8.50
 Southern Charcoal, No. 1 Foundry... 12.50 @ 13.50
 Southern Car Wheel..... 15.00 @ 15.50

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., April 24, 1894.

The market appears to have an improving tendency, and while prices are about the same it is easier to do business than it has been for a long time past. Consumers' requirements are widening, and in many cases deliveries are called for with the utmost urgency, showing that stocks are low, and that whatever demand there is must be supplied from new purchases. The amount of business done during the past two weeks is larger than for any similar period since last summer, and while there may be somewhat of a pause during the remainder of the month, there is good reason for believing that the improvement is genuine and likely to be maintained for some time to come. Prices are not quotably dearer, but sales average better, which with the larger turn over are strong points in favor of the manufacturer. Mills are doing more work almost without exception, some in certain departments are pushed to their utmost capacity, but averaging it all around there is easily two-thirds employment, which is much better than could have been said at any time within the previous six months. At Marshall Bros. & Co.'s mills the demand for Sheets for tinning purposes is crowding them to the utmost, and at Wilmington, Del., and North East, Md., the McDaniel & Harvey Co.'s mills are running full on their specialties. Similar reports come from the Structural mills and from some of the Plate mills, but less favorable reports are met with in regard to the Bar trade, although a few of the mills are doing fairly, but at extremely low prices. On the whole, however, the week has developed a fair degree of improvement, and as reports from the West are also of a very favorable character, the outlook for the near future is regarded with a good deal of confidence.

Pig Iron.—The demand has been very satisfactory, and while prices are in some cases at the lowest and in others only a trifle above that, there is nevertheless a better feeling, because at a price holders begin to feel sure that they can find a market. The heaviest end of the business has been in Bessemer, at prices equal to \$11.65 @ \$11.75, Philadelphia, and in Pipe Iron at \$10.50 @ \$10.75. This is a slight advance on the last mentioned grade, and 10¢ to 15¢ more is asked for Bessemer, but after the recent heavy purchases it is not certain that buyers will follow the advance, as their immediate wants are pretty well covered. In standard Foundry Irons there is a steady run of orders, and furnaces are in better shape than they have been for some time. There is a little irregularity in prices, due to the difference in freights to certain points, but on the whole the situation shows improvement, mainly in the better demand, which, however, is a necessary preliminary to better prices. General quotations for Philadelphia or equivalent points are about as follows:

Bessemer.	... \$11.65 @ \$11.85
Standard No. 1 Foundry X.	12.50 @ 11.85
Standard No. 2 Foundry X.	11.75 @ 12.25
No. 2 Plain.	10.75 @ 11.00
No. 1 Soft.	11.50 @ 12.00
No. 2 Soft.	10.75 @ 11.00
Standard Gray Forge.	10.75 @ 11.00
Ordinary.	10.50 @ 10.75

Steel Billets.—There is an irregularity in quotations which is somewhat puzzling in view of the firmer quotations on Pig metal. Sellers quote \$17.25,

Philadelphia, or its equivalent, but buyers intimate that they can get in at \$17 on 1000-ton lots, and in special cases this is probably true, although some makers decline to meet even \$17.25. A good deal depends on the size and character of order, however, as well as on the amount of business that the mill has in hand. At present the feeling is not favorable to anything at much over \$17 @ \$17.25, but if higher figures continue to be realized for Pig metal, the product must necessarily be adjusted in proportion.

Finished Material.—Reports from this department are generally of a favorable character, although there is no new work of special importance. Small work is very abundant, however, and from this class of consumers there is a steady day to day demand at somewhat better prices than those hitherto ruling. Mills report about two-thirds of their capacity in operation, which averages better than at any time for several weeks past, and from general indications it is probable that this or better will be maintained during the next two or three months. There is a good deal of irregularity in prices, however, and while the tendency is toward improvement, weak spots are occasionally met with, and offers from the West are heard of at extraordinarily low prices, particularly for Bars. General quotations are about as follows:

Grooved Skelp, delivered.	1.15¢ @ 1.25¢
Standard Refined Bars	1.30¢ @ 1.40¢
Medium quality.	1.15¢ @ 1.20¢
Tank Steel.	1.20¢ @ 1.30¢
Heavy Plates.	1.30¢ @ 1.40¢
Shell.	1.40¢ @ 1.50¢
Flange.	1.60¢ @ 1.80¢
Angles.	1.20¢ @ 1.30¢
Beams and Channels	1.40¢ @ 1.60¢

Old Material.—There is a better business all around, but prices show no improvement and are in fact barely maintained except for choice lots. General asking prices are about as follows, delivered:

Heavy Melting Steel.	\$10.00 @ \$11.00
Light Melting Steel.	8.00 @ 9.00
No. 1 Wrought Scrap.	10.00 @ 11.00
Machinery Cas.	9.50 @ 10.00
Wrought Turnings.	8.00 @ 8.50
Cast Borings.	6.00 @ 6.50
Old Iron Rails.	12.00 @ 12.50

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, April 24, 1894.

The strike of the Coal miners on Saturday, the 21st inst., with every probability of a general strike in the Coke regions within the next day or two, has brought about a very unsettled condition of affairs, and the future is very uncertain. Should the Coal strike be prolonged, as it promises to be, it will soon result in the closing down of the finishing mills, as few concerns have sufficient fuel to last more than a few days. On the other hand, should the Coke workers go out again, and reliable advices indicate that they will, a general suspension of operations among the blast furnaces will take place. It will likely be known in a day or two what proportions the threatened Coke strike will assume.

Pig Iron.—The large purchase of Bessemer by Eastern mills and also by speculators referred to last week, together with the heavy consumption by Pittsburgh and Wheeling mills, has pretty thoroughly cleaned up stocks, and Bessemer for prompt shipment is scarce and higher. The probability of a general Coke strike is also having its effect, and unless all signs fail further

advances in the market will take place. The largest Pig Iron maker in this district was credited with having 60,000 tons of Coke at the beginning of the former trouble, but this amount has been materially reduced during the last few weeks. As this concern are making close to 90,000 tons of Iron per month, it will be seen at once that they are comparatively little better off than their competitors. If the Coke strike is inaugurated it promises to be general throughout the region, as the demands of the men are for 90¢ \pm 100 bushels, as against 78¢ paid under the Frick scale. The situation to day is considerably more threatening than it was when the former strike was started. There are a number of inquiries in the market for Bessemer for early delivery, but there is considerable difficulty in finding furnaces that can promise prompt shipments. Gray Forge and Foundry are in very light demand, the foundries, as a rule, not being employed to more than half capacity. In our report last week the sale of Bessemer at \$9.75 at Valley furnace was equal to \$11.45 at Harrisburg, instead of \$11.25, as was stated. We have advanced quotations on Bessemer Pig and quote as follows:

Neutral Gray Forge.....	\$9.25 @	\$9.40, cash.
All-Ore Mill.....	9.35 @	9.50 "
No. 1 Foundry.....	11.00 @	11.25 "
No. 2 Foundry.....	10.25 @	10.50 "
No. 3 Foundry	9.75 @	10.00 "
Bessemer.....	10.50 @	10.75 "

We note a sale of 5000 tons of Bessemer for April, May and June at \$10.50 Pittsburgh, and also one of 2000 tons at same deliveries and terms. Also a sale of 50 tons of No. 2 Foundry at a price equal to \$10.25 Pittsburgh.

Ferromanganese.—This market is entirely controlled by the local concerns, and the price of \$53, delivered, for 80% domestic, is maintained.

Billets.—The market is in practically the same condition as noted last week. Makers both here and at Wheeling are well fixed and are quoting \$16 at mill, one local mill having set their price at \$16.25 at mill. Buyers are holding off, not being willing to pay the advance, which amounts to from 50¢ to 75¢ \pm ton. A mill in the Wheeling district will probably make some extensive improvements in the near future. The substitution of soaking pits for heating furnaces and the erection of an additional blast furnace are contemplated.

Structural Material.—A Western contract calling for close to 1000 tons that should have been placed some time ago has been unexpectedly held back by legal difficulties. Several fair sized orders for bridge material have recently been placed. Prices on Beams are showing a firmer tendency, 1.15¢ at mill being rock bottom for desirable orders and 1.25¢ for ordinary business. We quote as follows: Beams and Channels up to 15 inches, 1.20¢ @ 1.25¢; Angles and Universal Plates, 1.10¢ @ 1.20¢; Tees, 1.25¢ @ 1.35¢.

Plates.—The situation is without material change. The mills have a fair amount of work, but new business coming in is confined principally to small lots. We quote as follows: Tank Steel, 1.10¢ @ 1.20¢; Flange, 1.50¢ @ 1.60¢; Shell, 1.30¢ @ 1.40¢; Fire Box Steel, 1.75¢ @ 4¢, according to quality.

Sheets.—The large buyers are placing their orders and considerable tonnage was booked last week. The mills continue to refuse to quote for deliveries beyond July 1 next, in the expectation that labor troubles will take place.

We quote as follows: No. 24, 2.15¢; No. 26, 2.25¢, and No. 27, 2.35¢, at mill.

Bars.—The volume of business is small and there does not seem to be any indication of early betterment in this respect. Prices are being fairly well maintained and are without material change. We quote Common Iron Bars at 1¢ @ 1.10¢ at mill, half extras; Soft Steel Bars, 1.10¢ @ 1.20¢, with Bar Iron extras.

Merchant Steel.—Business is reported slightly better in the matter of inquiries. A local mill received an inquiry last week for a considerable amount of Steel for shipment to Canada. We have reduced quotation slightly on Open Hearth Machinery and quote as follows: Bessemer Machinery, 1.30¢ @ 1.35¢; Open Hearth Machinery, 1.50¢ @ 1.60¢; Open Hearth Spring, 1.70¢ @ 1.75¢; Toe Calk, 1.80¢ @ 1.85¢; Machine Straightened Tire, standard quality, 1.60¢ @ 1.65¢; Cold Drawn Steel Shafting, 2.57¢ \pm base; Tool Steel, 5¢ @ 7¢ for ordinary grades.

Muck Bars.—We quote nominally at \$19 for best grades delivered at buyers' mill. We are not advised of any sales.

Skelp Iron and Steel.—There is a fair demand with prices ruling as follows: Grooved Steel Skelp, 1¢ @ 1.10¢, according to size and order; Sheared Steel Skelp, 1.10¢ @ 1.20¢; Grooved Iron Skelp, 1.15¢ @ 1.25¢; Sheared Iron Skelp, 1.25¢ @ 1.35¢.

Pipes and Tubes.—Last week the Central Contract and Finance Company of Lafayette, Ind., placed an order for some 85 miles or more of Line Pipe, the order being divided among three concerns. The 8-inch and 10-inch Pipe, of which there were some 50 or 55 miles, together with about 25,000 feet of 5½-inch Casing, went to an Eastern mill. The 3 inch and 4-inch Pipe, amounting to about 25 miles, went to Pittsburgh, while about 10 miles of 2-inch Pipe was taken by an Indianapolis concern, but will be made in Pittsburgh. The Manufacturers' Natural Gas Company of Indianapolis, Ind., will probably let a contract this week for 4 miles of 8-inch Pipe and several miles of 6-inch. Several other fair sized contracts are in sight and are expected to be let at an early date.

Wire Rods.—Offers to sell Rods for May and June delivery on the basis of \$23.50, at mill, or about \$24. Pittsburgh, have recently been made. No sales are reported, buyers apparently having their wants covered for some time to come.

Barb Wire.—There is a good volume of business in Barb Wire, and makers are pushed to get material as fast as customers want it. In spite of this condition, prices are weak and lower. We quote Four Point Galvanized at \$2.10, Pittsburgh, and for a desirable order this price would probably be slightly shaded. We quote Painted at \$1.75 @ \$1.80, and Plain at \$1.85, in carload lots.

Wire and Cut Nails.—The demand is falling off to some extent, but on account of large orders booked some time ago, manufacturers are well occupied. We quote Wire Nails at 95¢ at mill in carload lots. Cut Nails are in only moderate demand, and we quote at 90¢ at mill for the usual averages. For desirable specifications this price is shaded slightly.

Connellsville Coke.—As noted elsewhere, the situation in the Connellsville

region is threatening, and indications point to a general strike. Reports received to day state that at two prominent works the men have ceased work voluntarily, but absolutely refused to go on strike two weeks ago. It is claimed the agitators in the region have successfully worked on the feelings of the men, and that a general sentiment prevails to cease work. Important developments are expected on Wednesday or Thursday. Furnace Coke continues to rule at 85¢ @ 90¢, and Foundry Coke at \$1 @ \$1.10 to consumers.

(By Telegraph.)

The situation in the Connellsville region to day shows that the strikers are making good headway and the number of idle ovens is rapidly increasing. All the ovens of Brown & Cochran are now idle. It is not improbable that every oven in the Connellsville region will be idle before this week is out unless the demands of the men are granted. The Atlas Coke Company have signed the scale demanded by the strikers. It provides for 90¢ \pm 100 bushels for mining, 53¢ \pm 100 bushels for drawing Coke, and 12½% increase in other wages. This firm operate about 150 ovens, the greater part of their output being taken by the Salem Iron Company, operating a blast furnace at Leetonia, Ohio. The balance of their product is sold in the open market as Foundry Coke.

St. Louis.

(By Telegraph.)

Office of *The Iron Age*,
St. Louis, April 25, 1894.

Pig Iron.—The strike of the Coal miners in Alabama is the only feature of the market at this writing. Orders are taken subject to furnace acceptance, and will continue so until the matter is settled. It is doubtful if the strike will have any effect on prices, as the stock of Iron on the furnace banks is sufficient to meet the wants of the trade for some little time. The demand is only fair and runs largely to carload orders. Prices are perhaps a trifle weaker but not quotably lower. We quote as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry.....	\$10.75 @ \$11.00
Southern Coke, No. 2 Foundry.....	9.75 @ 10.00
Southern Coke, No. 3 Foundry.....	9.50 @ 9.75
Southern Gray Forge.....	9.25 @ 9.50
Southern Car Wheel.....	16.75 @ 17.75
Lake Superior Car Wheel..	16.25 @ 16.50
Ohio Softeners.....	14.25 @ 14.50

Bar Iron.—The demand for Bar Iron does not show any improvement whatever. Car builders are doing nothing and do not look for any improvement in their business. Jobbers are buying only as their stocks need replenishing. Prices are weak, and a good round order with fair specifications would be taken at low price. Mills quote 1¢ @ 1.05¢. Jobbers report a dull trade at 1.25¢ @ 1.30¢.

Barb Wire.—There seems to be a falling off in the demand for Barb Wire and prices are not as strong as last reported. Painted is quoted at \$1.80 @ \$1.85 and galvanized at 40¢ \pm hundred-weight addition.

Wire Nails.—There is no improvement to note in this market. Nails are being offered at low prices, and it is difficult to quote the market accurately. Local mills ask \$1.10 for carload lots, but this price has been shaded in many instances. The future of Wire Nails is not very bright and lower prices seem inevitable.

Rails and Track Supplies.—A sale of 10,000 tons of Standard Rails was closed here last week. The Rails are for a Southern road. Track Supplies are dull, and are quoted as follows: Splice Bars, 1.30¢ @ 1.35¢; Spikes, 1.70¢ @ 1.75¢; Bolts, Square Nuts, 2¢ @ 2.05¢; with Hexagon Nuts, 2.10¢ @ 2.15¢; Steel Links and Pins, 1.60¢ @ 1.65¢; Iron, 1.75¢; Old Iron Rails are nominally quoted at \$10; Steel Rails, \$26 @ \$27.

Pig Lead.—The movement in this metal is restricted to carload lots, which command 3.22½¢. Offers of 3.20¢ do not find any sellers, and a higher range of prices seems assured.

Spelter.—The market is steady at 3.30¢. Sales are limited, and at the price above mentioned the market seems to have rested. Furnaces are closing down, and the producing capacity of the country is easily reduced 50%. A slight improvement in the demand will result in higher prices.

Robidoux & Corby, manufacturers' agents, have moved their offices from the Commercial Building to the new Security Building, where they have better and more commodious offices.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,
CINCINNATI, April 25, 1894.

There has been practically no business in Pig Iron during the week ending to-day, for the furnaces were not disposed to take orders for fear they might not be able to obtain Coal for an indefinite time, although they do not look for a prolonged contest. On the other hand, consumers of Iron do not require immediate supplies and are getting enough on contracts for their current necessities. There is no quotable change in leading qualities of Southern Iron, but there is scarcely enough trading to warrant quotations. There is nothing of consequence doing in Charcoal Iron. The orders from the East have fallen off and all parties in the trade are waiting to see what the future may develop. A possible advance in prices of Pig Iron would doubtless be welcomed even by consumers, as it is thought that the trades would thereby be benefited, for the low rates which have prevailed have proved to be unsatisfactory in most instances. Quotations are merely nominal, as follows:

Foundry.

Southern Coke, No. 1.....	\$10.25 @ \$10.10
Southern Coke, No. 2.....	9.25 @ 9.50
Southern Coke, No. 3.....	8.75 @ 9.00
Ohio Soft Stone Coal, No. 1....	14.50 @ 15.50
Ohio Soft Stone Coal, No. 2....	14.00 @ 14.50
Lake Superior Coke, No. 1.....	12.50 @ 13.00
Lake Superior Coke, No. 2....	11.50 @ 12.00
Hanging Rock Charcoal, No. 1....	17.00 @ 17.50
Hanging Rock Charcoal, No. 2....	16.50 @ 17.00
Tennessee Charcoal, No. 1.....	18.00 @ 18.50
Tennessee Charcoal, No. 2.....	17.00 @ 12.50

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	16.25 @ 17.00
Lake Superior Car Wheel and Malleable.....	16.25 @ 16.75

Forge.

Gray Forge	8.50 @ 8.75
Mottled Coke	8.25 @ 8.50

Metal Market.

Copper.—The strike on the Great Northern Railroad has seriously interfered with mining and smelting operations in Montana. That interference, in turn, has caused some operators to purchase supplies in other quarters to fill outstanding contracts. In one instance about 300,000 lb Electrolytic were taken at 9½¢ for such purpose, and it is understood that other purchases have been made. Apart from this the market is bare of new feature, only routine business being under way in Lake Superior Ingots or Casting Copper. Prices have varied in a slight degree only from 9½¢ and 9¢ @ 9½¢ for the respective varieties. Exports from this port during the past week include 611 tons bars, 334 tons pigs, 150 tons ingots, 188 tons plates and 20 tons cakes. Baltimore exports were 75 tons ingots, 111 tons cakes and 10 tons bars.

Pig Tin.—Prices have averaged somewhat below the highest point reached last week. On prompt deliveries 19.50¢ net cash for 5 ton lots was touched. May and later deliveries could have been secured at 0.5¢ @ 0.10¢ discount. From the extreme lowest figures a slight reaction took place toward the close. carload lots having been sold at 19.60¢ net cash during the past few days. There has been very little speculative business and not more than fair average buying for interior account or for consumption. Fresh supplies continue to be quite in line with the consumption, and London fluctuations still govern the movements of prices in this market to a great extent, since there are no really important local influences. At the close the market seemed quite stiff, with prices on the basis of 19.60¢ @ 19.65¢ net cash for Straits, prompt delivery.

Pig Lead.—Business here has been unimportant and involved only a few hundred tons all told. The transactions were mostly at 3.45¢ @ 3.47½¢, with single carloads at the last named price. There is no change in the general situation save that buyers in this vicinity are more reserved and not bidding 3.45¢ as freely as they did a week ago. Speculative interest is still extremely tame.

Spelter.—Sharp competition, in which two of the largest Western producers figured most prominently, has somewhat demoralized the market, and at present values are very uncertain. Sales have been made of common Western at 3.50¢ delivered here, prompt shipment, and some lots were purchased at 3.25¢ in St. Louis for Eastern account. In the face of this bids were made on 'Change of 3.52½ @ 3.57½¢ for July and later deliveries. Latterly there has been more or less curtailment of production, equivalent, it is estimated, to 25,000 tons per year. This was due mostly to loss in selling at late prices.

Antimony.—Merely routine business has passed, but enough of it to keep prices quite steady at 8½¢ @ 8½¢ for Hallett's, and 10¢ @ 10½¢ for Cookson's.

Nickel.—The popular price for round lots is 40¢. Small parcels bring 3¢ @ 5¢ more. Only routine demand is experienced here.

Tin Plates.—Business has been exceedingly slow. Orders for spot goods have fallen below the average, and in numerous instances sellers have shaded the prices generally quoted to the extent of 5¢ @ box on orders involving only a few hundred boxes. Forward

shipments, although offered at somewhat lower prices, have met with very limited sale. For stock on the spot we quote as follows: Coke Tins—Penlan grade IC, 14 x 20, \$5.10; J. B. grade, full weight, \$5.15; light weights, \$4.75 for 100 lb, \$4.65 for 95 lb, \$4.60 for 90 lb; Bessemer full weight, \$5.15; light weights, \$4.70 @ \$4.75 for 100 lb, \$4.65 for 95 lb, \$4.55 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.40; Siemens Steel, IC basis, \$5.50; IX basis, \$6.60. Charcoals—Melyn grade, IC, \$6.25; Crosses, \$7.75; Alloway grade, IC, \$5.40; Crosses, \$6.50; Grange grade, IC, \$5.50; Crosses, \$6.60. Charcoal Ternes—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.25; M. F. 14 x 20, \$7.20; do., 20 x 28, \$14.50; D. R. D. grade, 14 x 20, \$5; do., 20 x 28, \$9.75; Alym grade, 14 x 20, \$5.20; do., 20 x 28, \$10.25 @ \$10.40. Wasters—S. T. P. grade, 14 x 20, \$4.60; do., 20 x 28, \$9; Abercane grade, 14 x 20, \$4.50; do., 20 x 28, scarce.

Financial.

A significant proof of underlying strength and confidence in the financial situation is found in the fact that the market for securities has, during the past week, maintained its equilibrium in the face of many discouraging factors. The continued delay in the Senate over the tariff bill, the general dullness of trade, the serious strikes of workingmen in various parts of the country, the labor unrest which has resulted in such extraordinary movements as those of Coxey and his imitators, the continued reports of decreased railroad earnings, the export shipments of gold, would singly in ordinary times have served to affect the stock market unfavorably. But, as a matter of fact, all of these circumstances combined and active "bear" efforts into the bargain have not sufficed during the past week to depress values to any appreciable extent.

Speculation has in the main been narrow and confined largely to the "professional" traders; the outside public having apparently called a halt in their speculative and investment business in securities. Nevertheless, taking the entire list prices have been well maintained, and in some cases—notably in certain "industrials"—show an advance over those of last week. Some railroad stocks have declined a point or two from the closing figures of last week's report, particularly those roads on which strikes have occurred or are apprehended. Northern Pacific preferred stocks have dropped a point and a fraction. St. Paul, after a rise of two points late last week, on returns showing an increase in net earnings for March, has again dropped to the former level, following on less favorable returns for the first weeks of April. Atchison, Union Pacific, Burlington and Louisville have each dropped a shade. New York & New England has fallen a couple of points, in consequence of the announcement that the Reorganization Committee of that road proposed to assess the common stock \$20 a share. The committee's final plan will, it is expected, be published before the end of this week. Chicago Gas shares have been among the most active issues since the beginning of this week. They have been fluctuating feverishly for some weeks past as the prospects of a decision by the Attorney General of Illinois in the

matter of *quo warranto* proceedings were thought to be favorable or unfavorable to the company. The announcement on Tuesday afternoon that proceedings against the trust would be undertaken caused a sharp fall in the stock. Sugar, National Lead and National Cordage closed strong and active; and the market in general had a firmer tone on Wednesday. The following list shows the fluctuations of the more active stocks since the date of last report, with closing prices on Wednesday, April 25:

	High- est.	Low- est.	Closing Apr. 25.
Am. Sugar Ref.	99	95½	98½
Atchison, T. & S. F.	15½	13½	14½
Chicago Gas.	69%	63	63½
Chic., B. & Q.	81½	79½	80½
Chic., Mil. & St. Paul.	63½	61½	62½
Gen. Electric.	41	37½	38½
Louisville & Nashville.	51½	49½	50½
Missouri Pacific.	30½	29½	30
National Cordage.	23½	21½	22½
National Lead, Common.	40	36½	38½
New Jersey Central.	113½	110½	111
New York Central.	100½	98½	99½
N. Y. & New England.	10½	8½	9½
Northern Pacific, Pfd.	20%	18½	19½
Philadelphia & Reading.	20%	18½	20½
Union Pacific.	20½	19½	19½
Wabash, Pfd.	17½	16½	17
Western Union.	84½	83½	84½

Speculation in railway and miscellaneous bonds has for the time died away, but the market is good for choice bonds for investment. Prices for these latter are high and the supply below the demand. Outside the choice lines prices are weaker and business dull. Government bonds have remained firm and active. The transactions in 5's have been large during the week, and it is estimated that four-fifths of the bonds originally taken by the banks and trust companies have gone into the hands of investors. The insurance companies have been making some heavy purchases of Government bonds, and the inquiry from other sources is very active. For this reason it is believed that should a further issue of bonds be found necessary they would be readily absorbed. The closing quotations were as follows:

	Bid.	Asked.
2's, 1891, registered.	96	...
4's, registered.	113½	114½
4's, coupon.	114	114½
5's, registered.	117½	117½
5's, coupon.	118½	119½

The governors of the New York Stock Exchange on Monday adopted resolutions prohibiting so-called "arbitrage" business between the New York Exchange and exchanges in other cities, Boston and Philadelphia being particularly affected by the decision. The system was claimed to be inimical to the interests of the New York Exchange. The order has, nevertheless, created some considerable dissatisfaction among a section of the members.

Money in Wall street is more plentiful than ever. The drift of funds to this center continues so steadily that, despite the gold exports, the city banks gained in the aggregate last week over \$2,600,000 in cash. The volume of surplus over the legal reserve has grown to \$82,000,000. The difficulty of employing this plethora of money profitably is at the root of the recent gold exports, and for that reason the exports are not regarded with any apprehension. These exports amounted to \$3,000,000 from New York and \$500,000 from Boston by last Saturday's steamers, mainly to Paris, making about \$11,000,000 net exports of gold since January 1. Rates for exchange at the close do not show any profit in the export of specie, and it is not believed that any considerable amount more will go this week. The Treasury gold reserve is again down to

the \$100,000,000 mark, but Treasury officials are not apprehensive that it will fall to the level reached last fall before steps are taken for its reinforcement.

The loan market does not show any improvement. The supply of loanable funds is practically unlimited, while the demand does not expand to very notable extent, although there are indications that some interior banks are becoming desirous of obtaining credits from their New York correspondents. Call money is still nominally at 1%. Time loans for a whole year are reported to have been made on Government bonds at 1½%, and 2% on good stock collateral. Rates are quoted as 1½% for 90 days, 2% for four months and 2½% @ 3% for longer periods. Mercantile paper is dull, with a very limited supply of desirable material. Rates, 3% for best endorsed paper, 3½% @ 4% for high grade single names, and 4½% and upward for others.

Sterling exchange is firm, but the market is dull, with a meager supply of bills. Purchases against travelers' credits absorb all the bills offered. Actual business was done on Wednesday at \$4 87½ for 60 days, \$4.88½ @ \$4.88½ for demand, \$4.88½ @ \$4.89 for cables and \$4.86½ for commercial.

Exchange on New York at domestic centers is quoted as follows: New Orleans, commercial 100 premium, bank 150 premium; Charleston, buying par, selling ½ premium; San Francisco, sight 12½, telegraph 17½ premium; Savannah, buying par, selling ½ premium; Chicago, 35 @ 40 premium.

New York.

Office of *The Iron Age*, 96-102 Reade street, New York, April 25, 1894.

Pig Iron.—The event of the week, so far as the local market is concerned, is the announcement that the rate on Pig Iron from Birmingham to New York, rail and water, has been reduced to \$3.50, a cut of 50¢ a ton. It is not surprising in the present condition of affairs that sellers are promptly giving away this reduction to buyers. The latest advices from Alabama are to the effect that the furnaces are all still running, and that a few miners are returning to work each day. There has been no change in miners' wages in Alabama for five years, and even among the miners themselves many recognize the necessity of some reduction. As yet sellers of Alabama Iron in this market do not seem to have received any positive instructions to withdraw. It is reported that Buffalo furnaces have swept the Canadian market, making large sales of that Iron, with some Southern brands for mixing with it. We quote standard brands \$12.50 @ \$13.25 for No. 1; \$11.25 @ \$12 for No. 2; \$10.50 @ \$11 for Gray Forge, at tidewater. Southern Iron, same delivery, \$11.50 @ \$12.25 for No. 1; \$10.50 @ \$11 for No. 2; \$10 @ \$10.25 for No. 3; \$10.25 @ \$10.75 for No. 2 Soft, and \$10.50 @ \$11 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$9.75 @ \$10.25.

Billets and Rods.—The market is dull at \$17.50 @ \$18 for domestic, and nominally \$27 @ \$27.50 for foreign. Domestic Wire Rods are nominally \$26.50 @ \$27.50, and foreign \$39 @ \$40, tidewater.

Steel Rails.—Business in Standard Sections is very light. For Sections below the standard of 50 lbs per yard some low prices are being made. Thus

Pittsburgh quoted \$22.50, delivered at a Maine point, for a lot of less than 1000 tons of 48's, netting a little less than \$19.25 at mill. On light Sections \$22 @ \$25, according to section, is being done at tidewater, while Girder Rails are reported to have sold down to \$20.50, at mill. In the aggregate, quite a considerable business is done in Rails fit to relay, taken from some of the trunk lines and some of the New England roads. The quotation for these is \$15 @ \$16. We may note in passing a sale of 5000 tons of English Rails for Canada. We understand that English Rails can be put down, c.i.f., Montreal, at \$19.

Track Material.—We quote as follows for small lots: Spikes, 1.55¢ @ 1.80¢; Fish Plates, 1.20¢ @ 1.40¢; Track Bolts, Square Nuts, 2¢ @ 2.10¢, and Hexagon Nuts, 2.10¢ @ 2.30¢, delivered.

Manufactured Iron and Steel.—The only large contract for Structural Iron placed in this market this week is for the Paterson Armory, involving 600 to 700 tons, taken by a local mill. An extension for a dry goods house has also been closed. Figures are in on a few large buildings, and quite a number of other large structures are in sight. Agents representing some of the Pittsburgh mills state that their works are full for some time to come, and they are asking about \$1 @ \$2 per ton advance. The sharp competition among a number of Eastern mills, however, keeps prices down, so that there is no quotable change. Bars and Plates are very quiet. A feature in the Hoop trade is the decline in the consumption due to the growth of the tank oil trade. Comparatively few barrels are being used for the export trade, which has cut down the Hoop requirements of the Standard Oil Company very materially. We quote: Beams up to 15-inch, 1.30¢ @ 1.50¢ for round lots; Angles, 1.20¢ @ 1.35¢; Universal Mill Plates, 1.15¢ @ 1.35¢; Tees, 1.40¢ @ 1.60¢; Channels, 1.30¢ @ 1.50¢, on dock. Steel Plates are 1.20¢ @ 1.30¢ for Tank; 1.35¢ @ 1.40¢ for Shell; 1.55¢ @ 1.60¢ for Flange, and 1.75¢ @ 2¢ for Fire Box, and 2¢ @ 2.25¢ for Locomotive Fire Box, on dock; Refined Bars are 1.20¢ @ 1.9¢, on dock, and Common 1.05¢ @ 1.20¢; Soft Steel Bars are 1.15¢ @ 1.30¢; Scrap Axles are quotable at 1.3¢ @ 1.50¢, delivered; Steel Axles, 1.35¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.40¢ @ 1.50¢, delivered; Cotton Ties, 65¢ @ 70¢ per 45-lb bundle, at mill; Machinery Steel, 1.20¢ @ 1.40¢; Toe Calk, 1.80¢ @ 1.90¢, and Sleigh Shoe, 1.60¢ @ 1.75¢, delivered.

Old Material.—A good deal of mystery surrounds the reports of sales of Old Steel and Old Iron Rails for shipment to Italy. It is asserted on the one hand that about 3000 tons of Old Steel Rails, long lengths, have been sold at \$9, delivered to vessel, while authorities for the trade doubt the accuracy of the statement, and question that any business whatever has been done thus far. There seems to be no doubt that the inquiry has been in the hands of responsible parties, but it is asserted that freights cannot be secured to allow the business being carried through. It is stated that there are some feelers out for the English market, upon which Russia has drawn quite heavily for Old Material for some time past. For the home trade there has been a sale of 1000 tons of Old Steel Rails at \$9, delivered. Old Iron Rails are offered at \$11.50 @ \$12, according to point of

delivery, while No. 1 Wrought Iron Scrap is readily obtainable at \$10. Old Car Wheels are \$8, delivered to buyer.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, April 25, 1894.

Pig Tin prices declined early in the week, on very limited transactions, but subsequently recovered on purchases for American account and fair local speculative buying. Quite a large business was done in prompts, but the demand is rather small now. The market closed firm, with Straits at £70. 7/6 for prompt delivery, and £71. 2/6 for three months' futures.

Copper has been quiet. The market suffered somewhat from selling pressure by some speculative holders and the failure of a small dealer. Subsequent good buying at about £40. 1/3 for Merchant Bar prompts and lighter offerings by Americans brought about some improvement. Consumers' purchases have been limited, and they are moderate buyers now. At the close the market was steady. Merchant Bars quoted at £40. 2/6 @ £40. 5/ for prompts and £40. 12/6 @ £40. 15/ for three months' futures. Best selected English is at £43.

In the Tin Plate market depression is more severe after recent improvement. Sellers are yielding slightly to induce business, but make no quotable reduction in prices. Further concessions could not be made without positive loss. There is slightly more inquiry for Canada Plates, and some fair orders have been placed for Oil sizes. Liverpool quotations are as follows:

IC Charcoal, Alloway grade.....12/ @ 12/6
IC Bessemer Steel, Coke finish.....11/3 @ 11/6
IC Siemens ".....11/6 @ 11/9
IC Coke, B. V. grade, 14 x 20.....Nominal.
Charcoal Terne, Dean grade.....10/8 @ 10/6

Pig Lead has remained quite steady at £9. 2/6 for soft Spanish, with fair business.

Spelter is still quoted at £15. 12/6 @ £15. 15/ for ordinary Silesian, and the market remains quiet.

In the market for Iron and Steel no important changes have taken place. Last sales of warrants were at 42/8 @ 42/9 for Scotch, 35/10½ for Cleveland and 45/ for Hematite.

There is no doubt that negotiations have been pending for the sale of a lot of iron bars by a Birmingham, Ala., rolling mill for export to China. As yet they have not led to any business.

The break of the engine at the works of the Otis Steel Company, Cleveland, Ohio, will be repaired this week, when work will be resumed.

The fact that the farmers in several sections of the country through which the Coxey "army" has passed were vainly crying out for help, and were willing to give good pay for their labor, appears to be a decided refutation of

the theory that the so-called "Industrial army" is composed of genuine unemployed workmen. All accounts seem to point to the conclusion that the men are of the chronic idler class.

The Portage Iron Company, at Duncansville, Pa., will remodel one of their trains by putting in steel rolls and pinions so that they will be able to break down 4-inch billets on the hoop and cotton tie mill in the future.

The accountants appointed in connection with the wages sliding scale at the blast furnaces in the Middlesborough district, England, have ascertained from the books of the makers that the average realized price of No. 3 Cleveland pig during the first quarter of the year was 34 shillings 11.83 pence (\$7.50) per ton, or 7.21 pence (14.6 cents) increase on the figure for the previous quarter, and the wages at the blast furnaces will be increased 0.75 per cent. for the current quarter.

The Peacemaker is the significant name given to the new and largest rifled gun ever made in the United States. It is intended for mounting in the battery of the battleship "Indiana," now completing at Cramp's Yard at Philadelphia. The gun, whose mute pleading in its destined position should assuredly make for peace, is of 13-inch caliber, is 40 feet long and weighs 136,500 pounds. With a normal charge of 550 pounds of powder it can project a steel shell of 1100 pounds a distance of 14 miles. The weapon is breech-loading, and is worked entirely by hydraulic power in the matter of loading, training, cleaning, &c., the firing being done by electricity. At its recent test at Indian Head a muzzle velocity of 2100 feet per second was attained. Four of such guns are to constitute the primary batteries of the three battle ships "Indiana," "Oregon" and "Massachusetts."

The old suit of Armstrong *versus* Swift's Iron & Steel Works, which has been in the courts for a number of years, is again brought to public attention by the opinion just delivered at Newport, Ky., by Judge Crawford of the Circuit Court. Armstrong is receiver for the Fidelity National Bank of Cincinnati, whose cashier, Harper, wrecked it a few years ago. It was alleged by the Swift's Company that their treasurer, Matthews, conspired with Harper, who was also their president, to defraud the company by diverting to the bank large sums of money in order that Harper might use them in carrying through an extensive wheat deal in Chicago. The decision just rendered allows claims aggregating \$555,350 in favor of the Fidelity National Bank against the Swift's Iron & Steel Works.

According to the lately published census returns, the total valuation of property in the United States in 1890 was \$65,037,091,197, which was an increase of 49.02 per cent. over the returns of 1880, representing a per capita sum of \$1039. That the growth of the wealth of the country during the past five decennial periods has proceeded at a much higher ratio than the increase in population is shown by the following figures: In 1850 the total valuation of property in the country was a little over \$7,000,000,000, or \$308 per capita. In 1860 it was \$16,000,000,000, or \$514 per capita. In 1870 it was \$30,000,000,-

000, or \$780 per capita, and in 1880 it was \$43,500,000,000, or \$870 per capita. New York stands as by far the richest State, its wealth being estimated at \$8,500,000,000. Pennsylvania comes second, with \$6,000,000,000, and Illinois third, with \$5,000,000,000.

The Bloomsburg Car Works of Bloomsburg, Pa., report business brisk at their works. Among recent shipments have been several box cars, gondolas and flat cars to Cuba and some dump cars to Ocala, Fla. Orders at present in course of fulfillment include a quantity of flat cars for La Compagnie de Chemin de Fer de Colonisation de Montfort, Montreal, Canada, and coal cars for shipment to Little Glace Bay, Cape Breton, N. S.

CONTENTS.

PAGE.	
The Barr Compound Non-condensing Pumping Engines. Illustrated.....	787
American vs. European Basic Bessemer Steel.....	789
Business in Central Ohio.....	791
Manufacture of Tungsten.....	791
The Olsen Testing Machines. Illus.....	792
Rusting of Iron.....	795
The Western Foundrymen's Association. Illustrated	797
Bicycle Chain Testing Machine. Illus... The Diamond Ball Bearing Grinding Machine. Illustrated	799
San Francisco News.....	800
The Wheeler Press. Illustrated.....	800
The King Chain Hoist. Illustrated.....	801
Southern Pig Iron Rates.....	801
The Midland Steel Company.....	801
The Week.....	802
Another Chicago Railway Tunnel	802
Editorials:	
Can Prices Go Lower?.....	80
Milling in Transit Freight Rates on Steel.....	803
The Armies of Unemployed.....	803
A Revolution in the Lake Carrying Trade.....	804
Cast Iron Pipe Rates	804
Washington News.....	804
Correspondence.....	805
Obituary.....	805
The Coal Production of the United States	805
Personal.....	805
Manufacturing:	
Iron and Steel.....	806
Machinery.....	806
Hardware.....	807
Miscellaneous	807
The Iron and Metal Trades:	
Chicago.....	808
Louisville.....	809
Philadelphia.....	809
Pittsburgh.....	809
St. Louis.....	810
Cincinnati.....	811
Metal Market.....	811
Financial.....	811
New York.....	812
British Iron and Metal Markets.....	813
Hardware:	
Condition of Trade	814
Notes on Prices	814
Hardware Organizations.....	815
Bicycle Notes.....	815
Letters from the Trade.....	816
Remittance Blank.....	816
A Filing System for Buyers.....	816
Electrical Devices as Hardware.....	817
Business Methods.....	818
The Retailer's Advertising.....	818
Arrangement of Stores. Illustrated.....	819
American Catalogues Abroad.....	819
A Convenient Oilcloth Rack. Illus.....	820
Trade Items.....	820
The Problem and Its Solutions.....	820
Price-Lists, Circulars, &c.....	821
It Is Reported.....	821
Paints and Colors.....	822
Simplex Cork Puller. Illustrated.....	823
Hawthorne Julep Strainer. Illus.....	823
The Stevens Ideal Rifle. Illustrated.....	824
Special Screws and Bolts. Illustrated.....	824
Columbian Screw Plate. Illustrated.....	825
Harwood's Hornet Cartridge. Illus.....	825
Adjustable Bathtub Seat. Illustrated.....	825
The Star Coil Spring Shaft Support. Illustrated.....	825
Rapid Acting Vises. Illustrated.....	826
Tension Bolt Lock Nut Shear. Illus.....	826
The Matchless Coffee Pot. Illustrated.....	826
Current Hardware Prices	827
Current Metal Prices.....	834

HARDWARE.

Condition of Trade.

THE VOLUME of business is not as large as last April, and during the month there has not been the increase which was anticipated by some. In view of the general practice of purchasing only such goods as are imperatively required for immediate sale or necessary replenishing of stocks, some merchants are supplying their wants from jobbers rather than from manufacturers to a greater extent than heretofore. At the same time an unusual number of orders for comparatively small quantities are received by manufacturers. In fact, jobbers, manufacturers and commission merchants refer to the number of orders which are received as comparing well with any previous season, while the quantity of goods handled is less than usual. The fact that prices are low has the effect also of still further diminishing the aggregate of business as expressed in dollars and cents. Business on the whole is doubtless in a more healthful condition than for some time, and all kinds of goods are going more evenly into the hands of the trade. Prices show no improvement and in many goods the market is weak. Quotations also from jobbers and manufacturers vary considerably, there being an evident desire on the part of all sellers to obtain such business as is to be had. There continues to be a good deal of cutting of prices on the part of jobbers, some of whom are sending out special quotations to induce orders from houses who have not been purchasing with what they consider sufficient liberality. In this condition of things the judicious purchase of Hardware requires careful attention and constant effort to keep posted as to the changes in price which are occurring. Collections give no ground for complaint.

Chicago.

(By Telegraph.)

Shelf Hardware jobbers report their country trade fair, and even their city business is not as dull as had been anticipated when the building strike began. The past week, in fact, has seen a slight improvement. Orders are considerably more numerous than they were, but they are for small quantities

only, showing that merchants are still buying from hand to mouth. Seasonable goods are not active at present. The Refrigerator trade is slow and is not expected to show much improvement until the advent of warm weather. Manufacturers of Wire Cloth are again talking about a shortage. Jobbers are quoting \$1.45, and this price is held quite firmly in view of a probable short supply. The demand for poultry netting is large, and manufacturers are considerably behind in their deliveries on contracts. Jobbers' sales this year are practically double those of last year. This is now the height of the season for this branch of trade. Steel goods are quiet. Haying Tools are moving much more slowly than last year at this time, when the prospects for a heavy hay crop were so bright. Some improvement is noted in the demand for house furnishing goods, tinner's stock and tinware generally. Mail business is picking up in this line. Tin plate gives some indications of a stiffening in price. Spot lots of roofing plates and coke tin are very firm on account of the smallness of stocks. The American makers are overwhelmed with work and are running behind on deliveries, while stocks in importers' hands are lighter than ever before known. The demand for roofing tin is growing larger every week as the building season advances. The stocks of large architects have been completely exhausted, as importers will not keep any quantity of this on hand on account of Tariff uncertainties. Heavy Hardware is in a little better demand than last week, but trade is spasmodic, a day of big business being succeeded by two or three dull ones.

St. Louis.

(By Telegraph.)

The Hardware business shows some improvement. This is especially true as regards the West and Southwest. The volume of trade, however, does not compare with April of last year, and as no one expected it to do so no disappointment is felt. Prices do not improve in any line of goods, in fact some lines are weaker, notably Wire Nails and Barb Wire. There is no speculative element in the market, most of the purchases being for immediate needs. There is a good trade in Road Scrapers, Hoes, Rakes, Lawn Mowers, Wagon stock, Roofing Paper, Ice Cream Freezers, Wire Netting and Wire Cloth. Collections are excellent and will continue so just as long as dealers buy as they have been, from hand to mouth. It is overstocking which makes collections slow.

Notes on Prices.

Wire Nails.—The demand for Wire Nails continues active and of the same general character that has prevailed for some weeks. Some large orders are being placed from time to time, but the great bulk of the business is in orders of moderate size. The mills are fully occupied, but are desirous of having their production for some weeks to come covered by orders in hand, and are consequently moving energetically for such business as is in sight. The change in the Canadian tariff seems to make it feasible to ship goods to that market, and Canadian merchants are making inquiries as to quotations, freight rates, &c. The price of Wire Nails remains as at our last report, 95 cents for carload lots at factory being a representative quotation, but attractive orders can command 90 cents, a price beyond which we do not hear of any sales. Small lots from store in New York are held at \$1.15 to \$1.25.

Chicago by Telegraph.—Manufacturers' agents report city trade extremely dull, but orders are coming in for fair quantities from country merchants. The consumption in the country generally appears to keep up very well. The demand is considerably below what manufacturers would like to see, and they are again making more vigorous efforts to sell. Prices are therefore still drooping, and are now down close to \$1 Chicago. Jobbers report a smaller demand from stock, and have lowered their prices for small lots to \$1.10 to \$1.15.

Cut Nails.—There is little change in the Cut Nail market. Prices are still affected to some extent by Western competition, and in parts of the Eastern territory which are accessible to the Western mills the manufacturers are meeting Western prices and departing to a certain extent from the policy which was adopted some time ago to quote only delivered prices in the several markets. The low freight rates which are prevailing are also favoring the Western mills, as they are at present able to place Nails at points which heretofore they have not been able to touch. The price of Nails delivered in New York is 95¢ to \$1 base, small lots from store in New York being regularly quoted at \$1.10 to \$1.15.

Chicago by Telegraph.—Manufacturers report a moderate trade, which is fully as large as they have reason to expect at this season. Factory prices are still quoted at 95¢ Chicago on 55¢ aver-

age. Jobbers quote small lots from stock at \$1.05 to \$1.10.

Barb Wire.—The demand for Barb Wire continues fair, but prices are uneven and the tone of the market not so strong as a few weeks ago. The market is represented by the following quotations for Four Point Galvanized, delivered at the points named: Pittsburgh, \$2.05 to \$2.15; Cleveland, \$2.10 to \$2.20; Cincinnati or Allentown, \$2.15 to \$2.25; Chicago or New York, \$2.25 to \$2.35, but it is probable that these quotations can be shaded.

Chicago by Telegraph.—Local manufacturers are still full of work, and in some cases are behind with their deliveries on contracts. Eastern manufacturers, however, seem to have caught up with their orders, as their representatives are soliciting trade in this market and promising prompt delivery. Quotations on factory lots of Galvanized Barb Wire are now about \$2.15, Chicago. Jobbers report a much better demand from stock than for Nails, and quote small lots of Galvanized at \$2.30 to \$2.40.

Wire Cloth.—On account of the depression which has for some time prevailed in all lines of business, less than the usual quantity of Wire Screen Cloth was manufactured for the present season. The demand for this article is now setting in actively on the jobbers, and the manufacturers are receiving supplementary orders from those whose purchases were made a few months ago, and the result is that their stock is becoming very short and promises soon to be exhausted. In this condition of things manufacturers who have the goods on hand are advancing their prices with the prospect of still further advances in the near future. The market is thus quatably stronger owing to the scarcity.

The Palmer Trouser Guard.—This article, put on the market by Robert T. Palmer, 31 Otis Place, Buffalo, N. Y., was described in our last issue. It is sold nickelized or enameled at 50 cents net per dozen in less than gross lots. In gross lots it is sold nickelized at \$5 net and enameled \$4.80 net.

Redfield's Towel Holder.—This Holder, put on the market by J. R. Clancy, Syracuse, N. Y., and described in our last issue, is sold to the trade at \$3.50 net per gross.

Hendrick's Flanged Steel Screens.—Hendrick Mfg. Company, Carbondale, Pa., are putting these Screens on the market. They are made of perforated sheet metal and are intended for use in connection with sand, gravel, coal and stone. The Screens are sold from the following list, which is subject to a discount of 40 per cent. Terms, f.o.b. Carbondale:

No.	Size.	Light pattern.	Heavy pattern.
1	20 x 61 inches.....	\$5.00	\$6.00
2	22 x 66 "	5.50	6.50
3	24 x 71 "	6.00	7.00

Other sizes are made to order.

Sheet Zinc.—Matthiessen & Hegeler Zinc Company, La Salle, Ill., since the discount sheet on Sheet Zinc referred to in our last issue have sent out two further changes, each being in the way of reduction. The price continues \$4.50 for Sheet Zinc in 600-pound casks, of the thicknesses between Nos. 9 to 15, inclusive, and of the widths between 32 to 46 inches, and of the lengths between 84 to 90 inches. The extras are also unchanged. The discounts announced, under date April 18, are as follows:

Discounts.	First class. 15 600-pound casks and up- ward.	Second class. 10 to 14 600- pound casks.	Third class. 5 to 9 600-pound casks.	Fourth class. Under 5 600- pound casks.
	Per cent.	Percent.	Percent.	Percent.
Special.....	15	15	15	15
Cash with order.....	3	3	3	3
Quantity	3	2	1	0
Totals.....	21	20	19	18

All discounts are computed straight when money accompanies the order. Quantity discount is added to special discount in all cases. If remittance is received within 10 days of date of invoice the cash discount will be only 2 per cent. instead of 3 per cent., and not computed straight. Each order is strictly subject to the quotation of the class to which it belongs.

Glass.—There has been no radical change in the condition of the Glass market during the past week, though prices show an upward tendency. An increase is noticed in the number of factories in operation, which would indicate that manufacturers anticipate an increased demand and remunerative prices. A State organization of Indiana manufacturers has been formed, which has resulted in a stiffening of prices in the gas belt. The New York Window Glass market is represented by the following quotations: Single and double strength Glass in small quantities, 80 and 20 per cent. discount; in 1000-box lots, single, 85 per cent., and double strength Glass, 85 and 5 per cent. discount. Pittsburgh factory quotations are reported as 85 per cent. for single, and 85 and 10 per cent. discount for double strength Glass. New York Plate Glass quotations remain 70 and 10 per cent. discount.

Hardware Organizations.

Southern Hardware Jobbers' Association.

THE ANNUAL MEETING of the Southern Hardware Jobbers' Association will be held on June 5 in Richmond, Va. Arrangements are making to render this meeting especially attractive, and it promises to be one of the most interesting and important meetings in its history.

The Southern Hardware Jobbers' Association is one of the largest and most influential in the country, having

a membership of about 60 of the leading jobbing firms in the South.

Hardware Club of New York.

The Postal Telegraph Building, the prospective home of the Hardware Club of New York, is receiving the finishing touches, and it is expected that the club will enter on possession of its premises early in May. The rooms are now almost ready for occupancy, and in one of them the meetings of the Board of Governors, which in view of the many matters calling for attention are called frequently, are held. The

House Committee, upon whom a great deal of labor has devolved in connection with the furnishing of the club, has been increased by the addition of the following gentlemen: Charles Daly, A. G. Sherman and Brace Hayden, the committee now consisting of Peter McCartee, Eugene Bissell, Charles Daly, Brace Hayden, A. G. Sherman, Edward C. Van Glahn and John L. Varick.

New England Hardware & Iron Association.

A recent change has been made in the scope of the New England Iron & Hardware Association, by which manufacturers as well as merchants will be represented in its membership. Including as the association already does the leading wholesale houses dealing in Iron, Steel, Hardware and kindred lines in New England, it is expected that many manufacturers will become identified with it, thus making it a more thoroughly representative organization of the Hardware and Iron interests.

Bicycle Notes.

BUFFALO TRICYCLE COMPANY, Buffalo, N. Y., issue a catalogue devoted to their Fleetwing, Envoy and Envoy Scorchers Bicycles, the Fleetwing being a ladies' machine. They will continue to use rolled threads upon double butt and swaged spokes. They are introducing this season the Envoy Scorchers, a wheel designed for scorching purposes. The company continue to manufacture Gem Tricycles, and also illustrate the Perren-Atherton road Wagon, a light road Wagon mounted upon special gearing, supplied with wheels having cushion or pneumatic tires, as desired.

WYETH HARDWARE & MFG. COMPANY, St. Joseph, Mo., issue pamphlets showing the following Bicycles for 1894: Eclipse No. 20; Electric in Nos. 130, 128, 126, 126 C—ladies' wheel, 124 and 124 C—ladies' wheel; Western Nos. 13 and 18; boys' Junior, Pet, Children's Favorite, Sunbeam Scorchers and la-

dies' Sunbeam. The Sunbeam Cycles are sold as their high grade wheels.

BUFFALO WHEEL COMPANY, Buffalo, N. Y., issue a neat catalogue in which illustrations are given of their line of Niagara wheels, including the Century, Maid of the Mist, scorcher, roadster and racer. The machines list from \$100 to \$175.

HARRIS MFG. COMPANY, 381 Main street, Buffalo, N. Y., are putting on the market the Harris Combination Wrench, an illustration of which is given in the company's advertisement in this issue. In this tool are combined a Wrench, Oil Can, Screw Driver and Pump. The tool is described as made of drop forged steel, case hardened. Its weight is 10 ounces, which is referred to as 3 ounces less than the total weight of the different parts separate.

Letters from the Trade.

Selling to the Retailer's Customers.

FROM a house in West Virginia we have the following letter in regard to the frequency with which jobbers and manufacturers have direct dealings with consumers:

Our attention has been especially called to this matter of late by noticing at our depots bales of Wire shipped to individuals who are customers of ours, from firms in Baltimore, Philadelphia and Pittsburgh. These firms have representatives on the road who visit us to sell goods. Now this does not appear to us to be fair dealing, for we find this tends very much to the breaking down of prices and general demoralization of trade, trade we find being more demoralized this season than ever before, and we have greater difficulties to overcome. Ohio factories and dealers are especially given to doing business in this way, as they will furnish special quotations and ship goods to any individual who will write them. These letters are often shown to us by our customers, and we are sometimes told that for a 2-cent stamp they can get prices on anything we have.

Barb Wire in Smaller Reels.

A Hardware house in Virginia make the following suggestions with reference to Barb Wire:

We would suggest to manufacturers of Barb Wire that they should not put up the Wire in very large reels, unless for those who request it. More than once we have ordered and specially requested it shipped in 50 to 100 pound reels, and have instead received the Wire in about 100 to 140 pound reels. It is frequently the case that a customer wants anywhere from 25 pounds up, and even less. Some of these customers live 15, 20 or more miles away, and it is not convenient for us to reel off what they want, nor convenient for them to take so large a reel and return what they do not use, which we often allow them to do. It is the same with Plain Wire, but it does not make so much difference for obvious reasons. At one time we only knew of 63-pound coils, which was a good idea, all coils being of the same weight. The coil required no weighing when getting out to deliver, and the exact quantity on hand could be easily found out without weighing.

Shipping Goods.

In a letter recently received from correspondents in the South the following suggestions are made on differ-

ent matters connected with the shipment of goods:

We would suggest that more attention be paid by shippers generally to marking right weights on packages, so that the proper weights are manifested by transportation companies, which is frequently not the case. Attention should also be paid to the manner of packing goods so that they may come at the lowest freight rate. For instance, some goods packed in barrels come at a much less rate than in boxes. Others could be shipped loose as well as packed, thus saving boxing and freight on boxes. We don't approve of shipping such goods as "Castings," "Chains," &c., which are a cheaper class than those contained in packages. We think manufacturers and dealers should endeavor to have Hardware classified lower. Bills of lading as well as invoices should always be sent and in time to reach the consignee before the goods. Goods should also be packed so as to render the packages as little

wares. We notice that some manufacturers do this and that some agents announce the factories they represent or whose goods they handle. Some also do this on large postal cards, which are sent to customers notifying them of the coming of their salesmen, and we think other houses would do well to follow the example.

Remittance Blank.

H. D. HULL, Hardware merchant, of Troy, N. Y., is using the remittance blank given below. This blank is referred to as embodying recent improvements made by Mr. Hull, and is, it will be observed, of a simple and satisfactory character. At the top of the blank are the words "please receipt and return." Omitting the reference to Mr. Hull's business, the remainder of the blank is as follows:

TROY, N. Y.,

189

Gentlemen.

Enclosed find my check No.

in settlement of invoices as per memorandum:

For Invoice			
" "			
" "			
" "			
Less			
"			
"			
"			
Total amount,			

You will oblige by signing Receipt below and returning this statement.

Yours respectfully,

H. D. HULL.

189

Received from H. D. HULL, Check for
as above.

liable to breakage or disfigurement as possible, so that they may present a good appearance on the dealers' shelves. We would also suggest to manufacturers that goods be put up in as convenient quantities as possible, so that small buyers can buy in packages, which would be better for both buyer and seller. Everything else being equal, we buy the goods which are put up in the most convenient, substantial and attractive styles.

Addresses of Jobbers.

It will be observed that manufacturers in their advertisements frequently give the names of jobbing houses from whom the goods can be obtained. The desirability of this information is referred to in a letter recently received from an enterprising Hardware house, from which we make the following extracts:

We would suggest that in advertising manufacturers give addresses of parties in the most important cities from whom dealers can obtain their

A Filing System for Buyers.

THE FOLDING PAPER BOX COMPANY of South Bend, Ind., whose advertisement appears in this issue, offer an ingenious system of filing catalogues and quotations. It is called a "buyer's system of filing" as it is intended specially for use by those who attend to purchasing. The manufacturers of this system supply the boxes necessary for its operation, together with number cards, catalogue cards, gummed labels and an index book which admits of some 8800 entries, supplying ample space for liberal cross indexing. The boxes are of two sizes, 4 inches high by 4 inches wide by 11 inches long and 4 inches high by 12 inches wide by 11 inches long, either paper covered or cloth covered. All the boxes have cloth covered fronts with brass rings for pulling out. A cabinet or shelves to hold the boxes can be made by any carpenter. The company furnish cuts making suggestions as to the arrangement of shelving and the grouping of boxes.

With the boxes numbered and their contents entered in the index book with the box numbers, it is an easy matter to instantly locate any catalogue, circular or quotation. When a catalogue or other document is received, it is assigned to a suitable box and a label bearing the number of the box is pasted on it. Pamphlets and circulars fully describing the operation of the system and its advantages will be sent on application to the company. They refer to a very large list of manufacturers and merchants who have introduced the system into the purchasing departments of their establishments with satisfactory results.

Electrical Devices as Hardware.

BY W. E. GILL.

IT IS ONLY in recent years that electrical devices have come to be recognized as among the conveniences of the home and the necessities of the hotel, the business house, the bank and the factory. A few modern electrical inventions, notably among which are the telephone and the electric light, coupled with the energy and push of those engaged in the prosecution of electrical enterprises, have been largely instrumental in educating the public to a just appreciation of the value of electricity in domestic and business life. Electricity as applied to the liberal arts has become so extended in this country that a hotel without its guest call or a town without its electric railway, electric lights or the ubiquitous telephone would be considered commonplace indeed. Until recently electrical goods, with but few exceptions, have been handled and vended by manufacturers and dealers who made it their special business and who devoted their entire attention to the electrical industry. This was perhaps necessary while the goods were passing through their infantile period, and the same would apply to any like industry at the same stage. In many of its branches the electrical business will of necessity remain so, requiring as it does a special training to enable one to follow it successfully. There are, however, a great many articles and devices which are in constant demand almost everywhere, which have been so simplified as to render them staple.

WE WOULD CAUTION

the Hardware merchant who contemplates adding electrical goods to his already varied and diversified stock against going too far at the beginning. Location and the extent to which electrical enterprises are being carried on should have much to do with the choice of a line. Buy only from manufacturers or dealers of known and acknowledged reputation. There is, perhaps, no line of goods carried in stock by the Hardware merchant which he will be less able to criticise than his electrical stock. He must therefore rely upon the manufacturer or jobber giving him fair value in the goods they furnish.

THE INSTALLING

of electric railway and electric lighting plants, also fire alarm systems, is being

generally carried on by companies organized for the promotion of some special system, the apparatus for which is usually patented or controlled by them. This work of necessity requires more or less scientific knowledge and men trained in special branches to perform the work. There is much, however, that comes within the scope of the Hardware merchant, and that could bear the same relation to his business that the tin shop and furnace department now do. The extent to which he should engage in electrical work of course depends upon existing conditions. In a locality where there are electrical fitters, the merchant might find it more profitable to carry a limited stock of staple goods, so as to be able to supply the wants of the local trade, rather than to engage in competition with them. In this way he would avoid coming in contact with the consumer and avoid many of the petty annoyances incident to the electrical fitters' business and which arise from causes not under his control. All electrical devices depending upon a battery as the source of the electric current require

OCCASIONAL ATTENTION.

The battery must be supplied with water, and the elements when used up must be replaced by new ones. These simple matters are very apt to be neglected by the consumer, and when the electrical service fails, he invariably resorts to the fitter, who must needs make a trip to do what the consumer or his servant might have done had they been properly instructed. The merchant will indeed find more of these petty vexations to contend with in the electrical fitting department than in any other branch of his business. In the event of his adding an electrical fitting branch he should first acquaint himself with the simpler house appliances; the most common of which is the electric bell. There are manufacturers who have made a special study of the requirements of the Hardware trade in electrical devices for domestic and business purposes, and who put up and furnish in the most convenient form the goods which are in common demand everywhere, packing them in sets to suit most all ordinary requirements, and in such a form as to be readily stocked and handled from the shelf in the same manner that the merchant would handle a set of sliding door hangers or a set of store door handles and lock. The necessary directions are to be found packed with the sets, making it easy for a person of ordinary intelligence to put them in place in working order and to care for them without assistance from any one.

WHAT TO CARRY IN STOCK.

To start with, a merchant should place in his stock a few electric bell sets, such as are used for front doors and dining rooms in residences, for calls in office, banks, factories, stores, &c., selecting those sets which are packed with trimmings best suited to the requirements of his particular

locality. These sets come packed with sufficient electrical wire for connecting up in any house of moderate size. In a great many instances, however, more wire will be required than is packed with the sets. It will, therefore, be desirable to carry some electrical wire in stock, such as is commonly used and known as No. 18 gauge annunciator, on spools of, say, $\frac{1}{2}$ pound or 1 pound each, which sizes are regular; also $\frac{1}{2}$ -inch electricians' staples, in 2 ounce packages, packed one dozen packages in a box; and for repairs, some complete batteries and parts of batteries, such as battery zincs and sal ammoniac, in 5-ounce paper boxes or bags, one package being the quantity required for one complete charge for a single battery. A very simple, comprehensive and comparatively inexpensive sample for the salesroom may be made, using the wood box in which the set is packed, by screwing the cover to the back of the box, so as to extend above the box and mounting thereon the bell, wire and push, and placing the battery inside the box, all in full view; the battery then being charged and connected to the bell and push with the wire, and by pressing the push knob the bell will be made to ring, the current passing through the entire coil of wire. These electric bell sets should be on the shelf of every Hardware merchant, whether he does fitting or not, as they will meet the requirements of the average house builder or contractor in need of a simple electric bell, they being in the most convenient shape to handle and carry in stock. Should the merchant desire to engage in the

FITTING BUSINESS,

or carry stock for local fitters, he will find it convenient in addition to the sets to carry a limited line of electric pushes in bronze for out of doors, and wood for indoors; iron frame bells with 3-inch gongs for ordinary house and office use, and larger for barns, mills, factories, stores, &c., according to requirements; complete electric batteries and parts for same; No. 18 electrical wire on spools of $\frac{1}{2}$ pound, 1 pound and 8 pounds each; $\frac{1}{2}$ -inch electricians' staples in 2-ounce, $\frac{1}{2}$ -pound or 1-pound packages; electric door connections for use on store entrance doors to indicate the opening and closing of the door; dining room pushes to be operated with the foot for calling a servant during meals, &c. The foregoing list comprises the goods which are in most common demand where electrical devices are used. There are other and kindred lines such as annunciators for hotels and residences and electric gas lighting apparatus which it would be manifestly unwise for the Hardware merchant to handle as a selling stock, and rather beyond his ability to handle as a fitter until he thoroughly understands how to install electric bells in their various applications. Regarding equipments and supplies for electric street railway and electric lighting plants, it would be impossible

to here specify what goods might be advantageously handled, as local existing conditions and requirements and the knowledge of the merchant in these special branches of electricity will alone determine.

Business Methods.

WE RECENTLY published a communication from a Hardware house in which the desirability of having a broader margin on invoices was referred to, the object of such margin being to receive markings as to the receipt, disposition of the goods, &c. This suggestion has called out the following communication from a manufacturing concern in Chicago. This letter is of interest as showing the business methods adopted in connection with invoices:

I noticed the article headed "A Broader Margin Wanted," relating to invoices, in order to give space for buyers to make memoranda thereon. The design shown is so similar to this company's practice that I imprint hereon an impression of a rubber stamp, the blank spaces being filled out to show specimen notations that an invoice bears when returned to the office by the receiving clerk:

Rec'd 13/94 By J. Smith
Via Adams Ex Charges 30¢
Charge to Taxe Room

Each invoice as it arrives in the secretary's mail is by him entered in pencil on a memorandum book, showing date, name and amount, the page of the memorandum being noted on a back corner of the invoice.

It is then turned over to the chief clerk, who applies the stamp referred to and delivers the invoice to the stock keeper who is in charge of that particular class of material. This indicates that it has passed the chief clerk's desk and gives him the "run" of invoices in circulation. When the bills are vouchered the fact is shown on the memorandum by the use of a rubber stamp bearing the word "Vouchered," the page number on the back of the invoice (heretofore referred to) giving ready reference.

A prime use of the memorandum is to enable us to report to the treasurer weekly for financial reasons the amount of bills not vouchered, which is readily ascertained by disregarding all items stamped "Vouchered" and taking into account only those shown as open.

When the secretary receives the monthly statements he locates the items on the memorandum, using check marks on same to indicate that statement has been received and that the individual items agree, at the same time entering on the statement in connection with each item the page of the memorandum on which it appears. This gives the secretary a check on the transactions without referring to the invoices themselves, unless differences exist, and satisfies him that invoices have been received for all the items on the statement.

All of the operations referred to above are in actual practice with us and are really not so cumbersome as might appear at first sight.

The Retailer's Advertising.

Hints and Maxims.

FIRST SERIES.

BY AN EXPERT.

1. Ninety-nine per cent. of all advertisers say too much in their announcements and use too many words.

2. The advertisement that tells is the advertisement which in whole or in part can be observed at a single glance and which contains one emphatic word or sentence which induces the reader to read the whole advertisement.

3. A successful advertisement is generally of two parts, the heading or head lines and the descriptive matter. The heading of every advertisement, particularly if the space be limited, must be so short and contain so few words that it can easily be read at a considerable distance and cannot escape the eye glancing over the page.

4. Fortunate is the man who can invent one word for a heading, for one word is better than two, and two are better than three.

5. Better have the majority of readers read a short advertisement

each one complete in itself and each one devoted to some particular line.

12. The advertisement should leave something for the salesman to say. Advertising does not sell goods—that is the salesman's business.

13. Never use fancy or script type in an advertisement. There is nothing like Gothic or full faced letters for an advertisement. They are easily read and do not occupy more space than they deserve.

14. You have something to say. Say it as you would in a telegram. Your strong words first and almost as strong words last, and fill in between with the smallest number of words to give people an idea of your meaning.

15. Don't tell them too much. Make it so that they will be surprised when they see the goods.

16. Two examples of advertisements are added below. One represents the average newspaper advertisement. The other presents but one article in the briefest manner and in such a way that it attracts attention.

JOHN SMITH,
Dealer in

Hats, Caps, Furs,
Choice Groceries, Fine Teas,
Nails, Screws, Hardware,
Buggies, Wagons, Carriages,
Boots, Shoes, Rubbers, Watches,
Clocks, Silverware, Jewelry, Every
Variety of Dry Goods, Drugs, Chemicals,
Patent Medicines, Chamber Sets,
Parlor Suits, Rattan Chairs, Pipes,
Cigars and Tobacco, Electric Fixtures
and Lamps and Books.

JOHN SMITH,
44 SMITHVILLE AVE., SMITHVILLE.

NOTE.—Cottage house, half mile from depot, ten rooms and bath, stable connected, 15,000 ft. of land, for sale cheap.

One Style of Advertisement.



Another Style of Advertisement.

Arrangement of Stores.

F. P. CARUTH.

F. P. Caruth of Orange, Mass., has recently fitted up a new store in which the arrangement is excellent, being the result of careful planning and several years' experience. The store is 88 feet deep, 20 feet wide in front and 24½ feet wide in the rear, with a light and airy basement 2 feet longer than the room above, the

center and from the center to the back, with a depression at the center to receive the spool. This is a convenient method of handling Belting for retail purposes, while the cabinet is an attractive addition to fixtures. The office is located back of the stairway and extends about two-thirds of the distance across the room. The office is 15 feet deep and is provided with safe, desks, typewriter, cashiers' window, copying press, &c. Inside the office is a den or

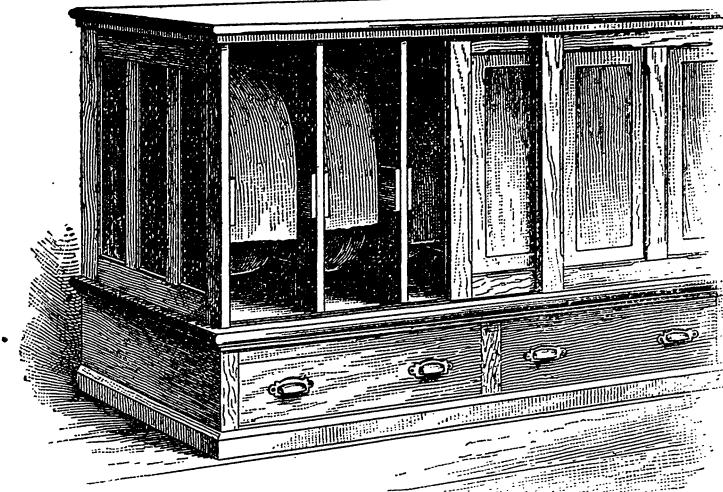


Fig. 840.—*Belt Cabinet.*

two rooms having a floor space of over 3650 square feet. Deep show windows in front give a fine opportunity for the display of goods, and there is also ample light at the rear and on the south side, where the office is located. The ceiling is of wood and the walls above the shelving are tastefully tinted. The store fixtures are of quartered oak finished in the natural wood. On one side of the room is shelving, fitted with drawers part way up, above which is duplicate stock in original packages. At the front, on the opposite side of the room, are six wall cases, each 5 feet wide and 6 feet high, lined with black cloth, and each covered with double sliding glass doors. The cases show samples of Fishing Rods and Tackle, Sporting Goods, Carpenters' Tools, Machinists' Tools, Cutlery and Brushes. Counters with showcases extend back on each side about two-thirds of the distance from the entrance to broad stairs descending to the basement. Abutting against the railing surrounding the stairway, with the openings to the front, stands the Belt cabinet shown in Figs. 840 and 841. The cabinet is about 3 feet deep, 4 feet high and contains 15 partitions, to accommodate Belting from 1 inch to 8 inches in width. The drawers underneath are used for Cut Lacing. The doors are provided at the bottom with wheels which run on brass rods and are guided at the top by dowels. The back of the cabinet is inclosed with $\frac{1}{2}$ -inch sheathing, and the top is of $1\frac{1}{4}$ -inch stuff. The construction of the partitions is shown in Fig. 841; they are made of $\frac{1}{2} \times 4$ inch boards. The dotted lines represent a half piece glued on to the cross piece, upon which the 3-inch hardwood spool revolves. This piece inclines from the front to the

private office 5 feet 6 inches by $9\frac{1}{2}$ feet in size, provided with a desk, chairs, &c. The space between the larger office and the north wall is utilized for Carriage Bolts, Coach Screws, &c. A revolving Bolt case stands near the entrance, and a 2×4 foot counter near the center of the room, while the walls are lined with shelving. The basement is used and fitted up for Paints, Oils, Steel Goods, Woodenware, Horseshoes, Nails, Barn Door Hangers, &c. Under the front sidewalk is a Glass rack capable of holding a large stock of Glass, with a Glass cutting table near it. The doors at the rear of the basement are wide enough to drive or back in a two-horse team, and here all freight will be received and all heavy goods delivered. The store arrangement and fixtures were planned by the proprietor and the establishment is referred to as among the largest and most finely finished in that section of the country.

American Catalogues Abroad.

A RECENT REPORT from the United States Consul at Hamilton, Bermuda, refers in the following terms to the excellence of American catalogues as compared especially with those of English manufacturers:

I find that the American catalogues are very much better illustrated than the English, which in many instances give the American goods the preference, although the English goods may often be a little cheaper. In ordering from the English catalogues, owing to their not being well illustrated and numbered, I often get something entirely different from what I ordered, and, in many cases, making dead stock. The English are much behind

the times in their illustrations. They furnish the dealer with six or eight little books representing as many different lines of Hardware very poorly classified, while the Americans give all in one well illustrated book, making it easier for the dealer to make selections, and also almost certain that he will receive just what he ordered.

Commenting on the above the London *Ironmonger*, recognizing the superiority of American catalogues and the wisdom of the course thus pursued by American manufacturers, remarks:

Many of the catalogues of British manufacturers are not nearly so well illustrated as they should be; and, taken as a whole, we are disposed to agree with the statement that the American catalogues are better done. This may or may not be the result of superior printing or better engraving in the United States; but, be the cause what it may, it is a pity that our manufacturers should be behindhand in a matter of such real importance. We have now before us a pile of American catalogues, and, although a few of them are gaudy and too florid, the great majority are beautifully got up, in convenient sizes, on good paper, and with illustrations which are generally of the very highest class. Why should not British manufacturers follow suit? Surely our engravers, process block producers and printers are equal to the performance of really first-class work! If not, then orders can be given to American or German printers until our own typographers and engravers are made to appreciate the necessity for keeping themselves thoroughly up to date. We suspect, however, that the fault is not so much with the printers and illustrators as with the manufacturers themselves. They are not so wideawake as they ought to be—and will have to be before long—to the absolute necessity of placing before buyers finished pictures

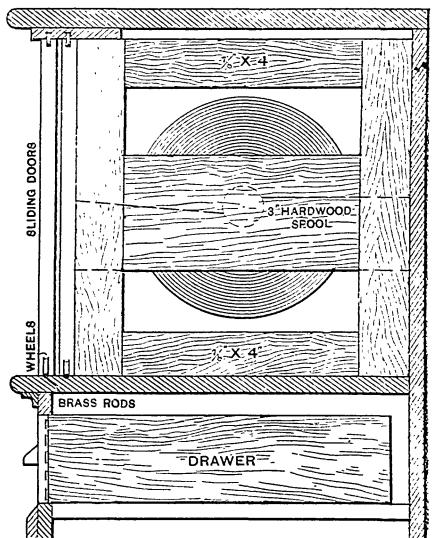


Fig. 841.—*Sectional View of Belt Cabinet.*

of their goods. The Americans have been alive to this for years past, with the result that their excellent engravings and good catalogues have sold far more articles in the neutral markets than would otherwise have been the case. It is said that "a word to the wise is sufficient." In this case we hope it is, for we are sure that it is a manifestation of most sincere friendship for our own manufacturers to tell them that as regards their blocks and catalogues they must improve very considerably and very quickly if they mean to hold their own against their American and foreign rivals.

A Convenient Oilcloth Rack.

THE ACCOMPANYING CUT, Fig. 842, represents an Oilcloth rack in use in the establishment of Shelly Brothers & Co., Bancroft, Mich., and solves the somewhat perplexing question of how oilcloth may be kept in a compact and convenient manner for exhibiting and retailing. The frame work of pipe stands on a platform about 7 feet long, mounted on wheels, so it can be easily moved to any part of the store. The bottom piece of the rack in front is of 1-inch gas pipe, 6½ feet long. The uprights are formed of 12-inch pieces of 1-inch pipe, put together with cross T's. The cross pieces or axles on which the oilcloth is hung are made of ¾-inch pipe, with lock nuts on both ends, and are run through the T's. The braces at the back are connected to the cross

tension to the fact that they are manufacturing a complete line of Bit Braces, an illustration being given of their Corner Brace. This company are and have been for the past two years under the management of their president and treasurer, C. S. Dumont.

Trade Items.

GOODELL COMPANY, Antrim, N. H., have recently added several new patterns to their line of Carvers, also several new patterns of Table Knives and Forks. They are just putting on the market a new Kitchen Knife, on the handle of which is stamped the word "Potato." This is referred to as a well finished article made from the best material, to meet the demand for a thoroughly good Kitchen Knife.

THE INDEPENDENT ELECTRIC COMPANY, Thirty-ninth street and Stewart avenue, Chicago, advertise in this issue their Goodhue Combination Cycle Lock, which they offer for the use of bicycle riders, traveling men,

tained from the most accessible standard authorities. The tables cover a wide range of subjects and deal with all trades.

THE PITTSBURGH WIRE COMPANY, Pittsburgh, Pa., manufacturers of Wire Rods and Wire of every description, will remove their Eastern office on May 1 from 7 Warren street to the new Postal Telegraph Building, 253 Broadway, corner Murray street, New York. James A. Farrelly, who is the Eastern sales agent of the company, advises us that they have increased their facilities for making special Wires, and are now in a position to fill all orders promptly for their mild steel Bolt, Rivet and Screw Wires.

AMERICAN STAMPING COMPANY, 104-106 John street, New York, are now manufacturing at their Brooklyn factory, in addition to regular lines, standard sizes of Ash Cans, cast iron enameled Cuspidors, Mule Stock Pails, sheet iron galvanized Water Pails, together with a full line of Galvanized Sheet Iron Ware, silverine embossed Trays and galvanized sheet steel Tea Kettles. They direct attention also to the fact that they have commenced the manufacture of all kinds of Deep Stamped Ware for enameling.

PECK, STOW & WILCOX COMPANY, 27 Chambers street, New York, have brought out a popular Family Soldering Set, which is offered as a convenience for doing odd jobs around the house. It consists of a ½-pound copper, handled, the copper portion being tinned all over, three strips of solder and a round tin box with cover containing a supply of rosin. The kit is inclosed in a neat wooden box with sliding cover.

The Problem and Its Solutions.

WE ARE still in receipt of replies to the question in regard to the settlement of the account published in *The Iron Age* of March 29, but the pressure on our space prevents us from printing them, especially as most of those which we have received during the past week have substantially the same conclusions as were reached by some of the earlier correspondents. The following letter, however, will be of especial interest, referring as it does to the answers which were published in *The Iron Age* April 5. The different solutions there presented are, it will be observed, acutely analyzed by our correspondent, who is a prominent Hardware merchant of the Pacific Coast.

I have been interested as well as amused in looking over the solutions furnished by various parties of the "problem regarding the settlement of account" in your issue of 29th ult.

As I read the question, the return of the first lot was the result of fault of B in the execution of the order. That being the case, and the goods being delivered at A's place of business free of cost to him for freight, as a matter of course the return freight also should be at B's expense.

Solution A answers the requirements excepting in one particular. The contributor estimates the freight allowance (actual freight, presumably) on the second shipment, although a larger one, at the same amount as on the first. I suppose in the absence of weights and rates he simply meant that the actual freight, whatever it might be, should be deducted in the settlement. The contributor of Solution D undertakes to adjust this item by the

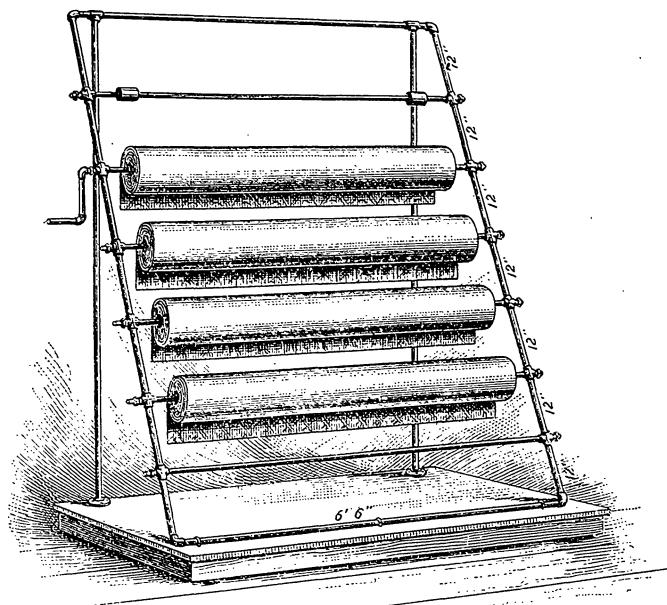


Fig. 842.—A Convenient Oilcloth Rack.

piece at the top of the rack by the use of T's, and at the bottom are fastened to the platform by plates. A crank is made of ¾-inch elbows and nipples. Holes are bored through cylindrical blocks of wood, two of which are used on each axle at the ends of the cloth, as shown on the upper one in the cut. When putting on a roll of oilcloth one of the lock nuts is removed from the axle, which is then passed through the oilcloth, and a tack is driven through each corner of the cloth into the blocks on the axle. The rack has been in use for two years, giving, we are advised, perfect satisfaction. When the season for oilcloth is passed the rack is hung on rods 2 feet long, suspended from the ceiling, and is utilized for piling unseasonable goods on.

THE TRADE will observe the advertisement in this issue in which the Amidon Tool Corporation, 1451 Niagara street, Buffalo, N. Y., for whom John H. Graham & Co., 113 Chambers street, New York, are agents, call at

owners of pleasure boats, &c. No two of these Locks are alike, there being more than 10,000 combinations. They can easily be operated in the dark, and no key is required. They are strongly made and highly finished. Parkhurst & Wilkinson, Chicago, are general Western agents.

SPECIALTY MFG. COMPANY, Hartford, Conn., have appointed David Eastman as their New York agent, with office at 64 Reade street. Here will be carried a full stock of the company's goods, including the Columbia Tack Hammer and Puller, Columbia Tack Puller, Columbia Nail Puller and Hammer, Black Hawk Nail Puller, Hartford Nail Puller and Boss Barrel Opener.

THE NEW YORK WIRE CLOTH COMPANY have recently moved their general offices from 53 to 102 Chambers street, New York City.

THE REPAUNO CHEMICAL COMPANY, Wilmington, Del., report a large demand for their "Atlas Memorandum and Reference Book," which they published early this spring. The book contains 163 pages of tables and useful information for practical men, ob-

rule of proportion, but after all it is only an estimate, and he also would in an actual transaction use the exact figures. Adopting D's idea of a proportionate freight charge, A's final figures would be \$71.50 instead of \$74.

In Solution B this question is avoided by providing for deduction of "any freight charges he may pay on the \$500 shipment," leaving the amount to be ascertained. But in this solution the back freight on goods returned is wholly ignored, although it is assumed that B "was at fault in first shipment of goods." If this ground is taken, it seems to me that the return should be at B's expense, and that the remittance should be \$84 instead of \$94, subject to further deduction of freight on the \$500 shipment (and interest, if any).

In Solution C the purchaser is made to stand both freights on the first shipment, since he is only credited with first payment of \$366, although he was entitled to \$10 more for freight and also to the freight back.

The ledger account should stand thus:

Merchandise..	\$400.00	Freight.....	\$10.00
"	500.00	6 per cent. dis-	
		count.....	24.00
		Cash.....	366.00
		Return freight 10.00	
		Freight on sec-	
		ond shipment 12.50	
		Mercandise	
		returned....	400.00
		6 per cent. on	
		\$100.....	6.00
		Cash.....	71.50
	<hr/> \$900.00		<hr/> \$900.00

You will see the final entry in Solution C is a credit of \$8.50, which is an amount not readily deduced from any of the conditions of the problem, and smacks somewhat of "forcing" a balance.

In Solution D an element of interest is introduced. I don't think the proounder contemplated a question of interest, as he made no suggestion of it; the delay of two months was the delay of the purchaser in "finding" the defect, and the rule is to limit the time for reporting errors to, say, ten days after arrival. In all probability he had time to check his invoice and inspect his goods before sending his check. However, admitting the interest, a further deduction of \$10 back freight is in order, leaving settlement to be \$68.33 instead of \$78.33.

Solution E allows \$84 in final settlement, subject to claim for cartage on first lot and interest for one month, but admits that B could justly claim that defect should have been discovered sooner. I have stated in my remarks on Solution D why interest should not be allowed, but if I am mistaken and there should be a claim for interest, then the 50 days—that is, two months' time less 10 days—is a period justified by the conditions, while one month is a "jump" estimate favoring of arbitration or "splitting of difference" rather than a result of figures. This solution (E) does not allow the \$10 back freight, unless that is what he intends when he says A could if he so desired claim cartage on the first shipment. This I hardly feel warranted in assuming, and so am of opinion his solution should be corrected in this regard so as to read \$74 instead of \$84.

Price-Lists, Circulars, &c.

THE IOWA FARMING TOOL COMPANY, Fort Madison, Iowa: Export illustrated catalogue No. C. The catalogue illustrates, with prices, a line of Cradles, Forks, Hoes, Rakes, Manure and Potato Hooks, Walk Cleaner and Turf Edger, Shepherd's Crook, &c.

THE INTERCHANGEABLE TOOL COMPANY, Utica, N. Y., W. W. Pryor & Co., 81 Chambers street, New York, agents for New York, New Jersey and New England: Hall's American Nippers, Pliers, &c. A line of Hall's goods is shown, including Compound Lever Nippers; Adjustable Face Vises; Telegraph, American, Center Cutting, and Side Cutting Pliers; Champagne Wire Cutters; Diagonal Cutters; Telephone Pliers; End Cutting Nippers; Compound Seal Press and Side Cutting Burner Pliers. The Side Cutting Burner Pliers and the Diagonal Cutters with double cutting faces are recent additions to their line of tools.

HARBER BROS., Bloomington, Ill.: Buggies. An illustrated catalogue and price-list shows a line of Buggies, Farm and Spring Wagons.

W. N. DURANT, 237 Twenty-second street, Milwaukee, Wis.: Blotting pad with calendar for April and references to Durant's Counters.

E. C. MEACHAM ARMS CO., St. Louis, Mo.: Catalogue No. 571. Sporting Goods, with discount sheet.

THE BOURKE MFG. COMPANY, Youngstown, Ohio: Hardware Specialties. An 1894 catalogue and price-list shows ventilating and diagonal Sash Locks, Window Cleaners, Handle Couplings, Floor Scrubbers and Dryers, Bar Cleaners, and Combination Brush Mop and Sponge Holder.

CHAMPION IRON & WIRE WORKS, Omaha, Neb.: Iron, Wire and Brass Work. A large sheet illustrates a line of Wire, Iron and Brass Goods, including Fences, Stable Fixtures, Bank Railings, Flower Pot Stands, &c.

THE UNITED STATES WIRE MAT COMPANY, Decatur, Ill.: Catalogue of Wire Mats, showing the variety of styles for all uses manufactured by this company; also the Rapid Spiral Screw Driver.

THE LEACH ROASTER AND BAKER COMPANY, Paxton, Ill.: Circulars descriptive of specialties manufactured by this company, viz.: The Abell Coffee Pot, the Lebanon Beater for beating eggs, mashing potatoes, &c., the Travers Improved Roaster and Baker, the Perfect Cooking Mat and Griddle, the Ristedt Patent Combination Utensil Holder, the Sensible Chopping or Mincing Knife, the Perfection Cake and Pie Tin, the Midget Umbrella Holder, the Magnet Broom Support, the Cook Rotary Grater and Slicer, the Lebanon Cake Cutters, the Poached Egg and Vegetable Lifter, the Perry Separable Perfection Cake Pan, the Paxton Bread, Cake and Layer Cake Pans, the Little Monitor Tea and Coffee Cooker, and the Leach Improved Roaster and Baker.

THE G. M. SHIRK MFG. COMPANY, 112-114 Lake street, Chicago, William A. Stokes & Co., 30 Warren street, New York, agents: North Star Refrigerators. An 1894 illustrated catalogue and price-list shows a line of these goods in a variety of styles and sizes.

ETTE & HENGER MFG. COMPANY, St. Louis, Mo.: Plumbing and Waterworks Catalogue, No. 5, May, 1894. The catalogue and illustrated price-list contains 174 pages, bound in cloth, and is devoted to Plumbing and Waterworks Specialties. The manufacturers state that they have recently increased their manufacturing facilities in all departments and have added several new ones, and are now in a position to furnish goods upon favorable terms and in the shortest possible time.

MAST. FOOS & CO., Springfield, Ohio: Catalogue No. 10. The catalogue and price-list, containing 144

pages, is bound in cloth, and illustrates, in almost complete form, the line of goods manufactured. In the line are included Buckeye Force Pumps, Iron Turbine Wind Engines, Columbia Steel Wind Mills, Steel Wind Mill Derricks, Buckeye Steel and New Buckeye Lawn Mowers, Iron Fencing, Cresting, &c.

WILLIAM P. KELLOGG, Troy, N. Y.: Mortising and Boring Machines. A pamphlet illustrates a foot-power Mortising Machine, the Parmelee Upright and Angle Boring Machines and the Kellogg Upright and Angle Boring Machines.

THE REPAUNO CHEMICAL COMPANY of Wilmington, Del.: A 31-page pamphlet addressed to farmers entitled "How to Increase the Value of Your Land, by the Removal of Stumps and Boulders." The pamphlet fully describes the best methods for removing stumps and boulders by the use of explosives, and illustrates the placing of a charge and the effect of a blast. The pamphlet also treats of frozen cartridges and the methods employed in thawing them; blasting log jams and railroads; blasting ice; sinking wells, and electrical blasting. The Powder recommended in these operations is the Atlas Powder, made by the company, and which they state has been for many years a standard in mines and public works. The book also contains a page illustrating the different tools and materials used by farmers for blasting purposes.

C. SIDNEY SHEPARD & CO., Chicago: Spring circular of seasonable and other goods. The circular is devoted to Water Coolers, Freezers, Milk Can Stock, Milk Kettles and Pails, Japanned Goods, Mica, Oil Stoves and Lamps, Oil Cans, Tin Plate, Galvanized Iron, Eaves Trough, Cement Coated Wire Nails, &c.

It Is Reported—

Colorado.

That the copartnership heretofore existing between E. Harris Jewett and C. A. Crane, under the name and style of the Midland Hardware Company, COLORADO CITY, has been dissolved by mutual consent, Mr. Crane retiring. The business will for the present be continued by Mr. Jewett alone.

That C. E. Day's Hardware store, at DENVER, was robbed of a quantity of Cutlery on the 7th inst.

Illinois.

That John Nickle, ALGONQUIN, has sold his stock of Hardware to a Hampshire concern.

That burglars broke open the safe of Titsworth & Powell, Hardware merchants of AURORA, on the night of the 17th inst., and secured \$50 in cash; \$200 worth of goods were also stolen.

That the Hardware store of Keller & Co., EDWARDSVILLE, was burglarized on the 9th inst.

That Knapp & Schock, PEARL CITY, the new Hardware firm, are now ready for business at Yeager & Son's old stand.

That F. M. Clark has bought a Hardware store at CAMP POINT.

Indiana.

That the Hardware store of J. S. Bowers & Co., DECATUR, was burglarized on the 17th inst., and about \$65 worth of goods taken away.

That Kaufman E. Funk has purchased the remaining stock of Hardware of Keen Bros. & Krupp, ELKHART, and will continue the business at the old stand.

That W. W. Foulke & Co., RICHMOND, who have been identified with the Hardware business for many years, have closed out, Mr. Foulke retiring. The stock has been purchased by the Jones Hardware Company.

April 26, 1894

Iowa.

That L. Farnham has bought the Hardware and grocery stock of C. Dean, ROCKFORD.

That Peter F. Klein of CALMAR has bought a half interest in a Hardware store at VOLGA CITY, Clayton County.

That Alexander Weir has disposed of his Hardware business at MONTEZUMA to A. A. Brown of STUART.

That C. L. Becker's Hardware store at KEOKUK was robbed on the 10th inst.

Kansas.

That W. W. Work has traded his residence and business in ERIE for J. M. French's \$14,000 stock of Hardware at TOPEKA.

Michigan.

That F. H. Darrow of TEKONSHA has added a stock of Hardware to his tin business.

That the entire stock of the Muskegon Hardware Company of MUSKEGON has been transferred by C. H. Hackley and the Geo. Selkirk estate to John H. Banninga and Frank Alberts.

That the interest of Mr. Pettit, recently deceased, in the Hardware firm of Pettit & Minnie, EATON RAPIDS, has been purchased by Merton P. Bromeling, who will discontinue his business recently started at Onondaga and remove the stock to EATON RAPIDS.

That fire destroyed the Hardware store of H. Soames, MAYVILLE, on the 13th inst.

Minnesota.

That E. H. Dunton of Ludden, N. D., has traded his stock of Hardware for that of the Annandale Hardware Company of ANNANDALE.

That the Hardware store of Tennis & Plummer, PARK RAPIDS, was entered by burglars on the 12th inst. and some Shot Guns stolen.

That the Hardware store of Alderman, Sylvester & Eiseth, CROOKSTON, was damaged by fire on the 15th inst. The loss on building and stock was about \$1600, fully insured.

That Wood & Co., Hardware dealers at St. LOUIS PARK, have removed their stock to PINE CITY.

That D. Shutt has bought a half interest in G. J. Dunford's Hardware business at CANTON.

That R. A. Ferris of GRENADA has completed a deal with T. G. Tomlin for his half interest in the Hardware business of Tomlin & Fields, at LAKEFIELD.

That the Hoppin Hardware Company, DEXTER, have commenced the erection of a large brick building which they will occupy on completion.

Missouri.

That the Hynson Hardware Company of St. LOUIS have filed articles increasing their capital stock from \$15,000 to \$30,000. The assets of the concern are given as \$30,000 and the liabilities as \$16,632.15.

Nebraska.

That sneak thieves broke into the Hardware store of George Scheidel, PLATTE CENTER, on the 9th inst. and carried off about \$200 worth of goods.

That burglars on the 9th inst. forced open a window in the Hardware store of Furlong & Eustice, AUBURN, and got away with \$50 worth of Revolvers and Cutlery.

New Hampshire.

That the firm of F. E. Wallace & Co., Hardware dealers of ROCHESTER, have dissolved partnership, Frank E. Wallace and Henry L. Berry having purchased the interest of E. G. and E. Wallace. The business will be conducted by them under the same firm style as formerly.

New York.

That Charles Taylor has purchased his father's Hardware business at ADISON.

North Dakota.

That the Annandale Hardware Company of ANNANDALE, MINN., have exchanged their stock for that of E. H. Dunton, at LUDDEN.

Ohio.

That the Hardware store of J. D. Inderieden, at LARAMIE, was broken into by burglars on the 16th inst., and \$500 worth of merchandise taken away.

Pennsylvania.

That early on the morning of the 17th inst. burglars blew open the safe in D. M. Rickabough's general store at MILLERSTOWN, and set the store on fire. The building and the entire stock of Hardware, groceries, &c., were destroyed. The loss is about \$15,000, with insurance of \$8000.

South Dakota.

That G. F. Reinick has sold his Hardware store at CANISTOTA to Albert Staples.

That L. K. Phillips of SPENCER, Iowa, has purchased a Hardware store at YANKTON.

That Dickson & Taylor have opened a new Hardware store at ARMOUR.

That the Acme Mfg. Company, PEKIN, ILL., have established a large wholesale house at HURON, for the convenience of Agricultural Implement dealers in North and South Dakota.

Texas.

That E. Hauser's stock of Hardware at HEMPSTEAD, Waller County, was almost totally destroyed by fire on the 15th inst. Loss, \$7000; insurance, \$4500.

Vermont.

That William Patrick has sold his interest in the Hardware business of Read & Patrick, HINESBURGH, and is about to move to ELWOOD, NEB. Thomas Cassidy has bought Mr. Patrick's interest.

That R. S. Hooper of GROTON has bought a Hardware store in HARDWICK.

That the Hardware store of Howard & Brown, LUDLOW, was broken into by burglars on the night of the 14th inst. and a quantity of Pistols stolen.

Wisconsin.

That the Frank Leach Hardware Company, OSHKOSH, have been incorporated with a capital of \$2000. The incorporators are F. J. McPherson, F. A. Leach and R. M. Burtis.

That the Hardware store of I. Miller, PLYMOUTH, was recently damaged by fire.

That C. J. Putnam has purchased J. M. Laube's interest in the Hardware store of Laube & Hahn, BRODHEAD, and the firm style has become Putnam & Hahn.

That the Hardware store of John Crook, REEDSBURG, was burglarized a short time since, \$300 worth of goods being secured by the thieves.

That burglars entered the Hardware store of John Crook, at REEDSBURG, a short time since and secured \$300 worth of goods.

That the Hardware store of E. P. Laugesen, FLORENCE, was entered by burglars on the 17th inst., and \$20 worth of goods stolen.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

White Lead.—There is not a new feature in the market. The various manufacturers are making prices to suit conditions. The latter contrast in no marked degree with what has been the rule since the opening of the spring season. There is a wide variety of list

prices, quite as much variety in actual or promised discounts, rebates, &c., and upon the whole a market more or less confusing to the average buyer. Dry White Lead, for example, sells at anywhere from $4\frac{1}{4}$ ¢ to 5¢, basis price; but when it comes to net result to buyers who take sufficient quantities of the pigment and abide by certain conditions, the real advantage in the lowest gross price is difficult to discover. The line of distinction is hardly as fine in the instance of Lead in Oil, since there are more varieties, but careful buyers can doubtless make as good bargains with the largest producer as with the smaller competitors, particularly where quality may be any object. A net rate above 5¢ for best brands in round lots is not exceptional.

Red Lead.—Domestic brands are moving at former prices, but rather slowly, and the demand is hardly up to what might be expected in view of the indifferent manner in which the larger consumers have purchased of late. Prices are still uneven, but show no radical change. Foreign brands are selling slowly at about previous prices.

Litharge.—Low grades have been purchased somewhat freely by rubber manufacturers, and a better demand from glass manufacturers is reported, but all orders have been taken care of in a manner that prevented any improvement in prices. Over $4\frac{3}{4}$ ¢ was rarely paid. The high grades have met with slow sale, and prices for the same are still more or less irregular.

Orange Mineral.—The market is wholly unchanged. Sellers name former prices for foreign and domestic brands and remark also that sales have been moderate. German brands at about $7\frac{1}{2}$ ¢ seem to have fared the best.

Zincs.—There is rather weak undertone to the market for American Oxide, and some indication that at least $\frac{1}{4}$ ¢ concession would be made to buyers of common quality in round lots. Just now there is no market for other than moderate quantities and actual trading basis is difficult to arrive at. Ordinary jobbing quantities are moving at practically old prices. Foreign Zincs are without change in price and sell slowly.

Paris Green.—The Associated Manufacturers have agreed upon the following prices and discounts:

	Cents per pound.
Arsenic, kegs or casks....	20
Kegs, 100 to 175 pounds....	20 $\frac{1}{2}$
14-pound, 28-pound, or 58-pound pack-ages, net weight....	22
2-pound to 5-pound paper boxes....	22
1-pound paper boxes.....	22 $\frac{1}{2}$
$\frac{1}{2}$ -pound " "	24 $\frac{1}{2}$
$\frac{1}{4}$ -pound " "	26 $\frac{1}{2}$

One to 5 lb tin boxes put up to order at an advance of $\frac{1}{2}$ ¢ $\frac{1}{2}$ lb over paper boxes of similar sizes.

Rebates: 3¢ $\frac{1}{2}$ lb on lots of 10,000 lb or over; $2\frac{1}{2}$ ¢ on 4000 to 10,000 lb; 2¢ on 2000 to 4000 lb; $1\frac{1}{2}$ ¢ on 1000 to 2000 lb; 1¢ on 500 to 1000 lb, purchased during the season. Terms, payable July 1, 1894, with discount at 6% for unexpired time.

Colors.—In grinders' Colors there has been hardly the average business. The market, as a matter of fact, is momentarily lifeless, and the little business passing is at former prices. Oil Colors and Mixed Paints have fared nicely in a jobbing way as far as sales are concerned, but prices keep low and the market gains little if anything in tone.

Oils and Turpentine.

Linseed Oil.—There is a fairly firm output appearance to the market. Some facts come to notice indicating that the market is weaker beneath the surface than above it. Most prominent among these is the fact that out of

town brands of established reputation can be secured at 2¢ $\frac{1}{2}$ gallon under the list price quoted by the Association city crushers. This combine price is 52¢ for Oil made from American seed. The outsiders offer at 50¢. The latter price is shaded more or less by concerns independent of the city and Western combines, and, upon the whole, affairs are decidedly in a tangle, although some efforts are making to create a different impression. Some Western brands were quoted at as low as 48¢ in carload lots.

Cotton Seed Oils. — Slightly firmer tone characterizes the market for Crude Oil, sales having been made at 28¢, while bids of 27¢ were subsequently refused for good sized lots. No large business resulted, however, and the strength of the market is more sentimental than otherwise. In refined there has not been a great deal of business, but limited offering and speculative "bull" movement on a small scale served to carry prices up to 33¢ @ 33½¢ for prime Summer Yellow and correspondingly for other varieties.

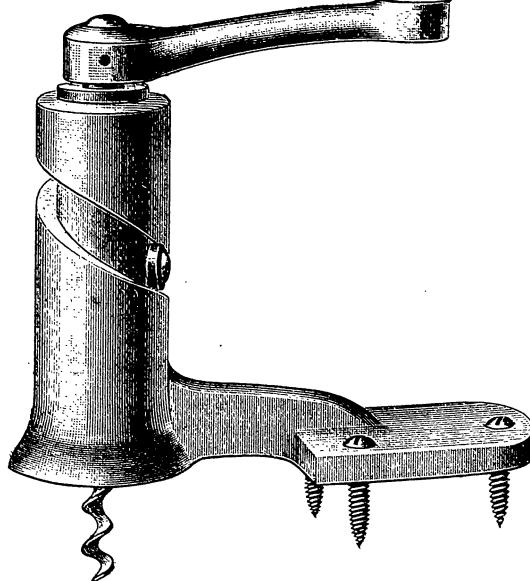
Lard Oil. — Prices have moved a shade higher. Prime Oil, local make, realized 65¢, and Western went at within 1¢ of that price. The quantities taken were moderate, however, and the market is at present in a quiet condition, with no sign that other influence than movement in cost of raw material is affecting prices. The low grades are slow of sale and unchanged.

Fish Oils. — Apart from a sale of about 300 barrels crude Sperm at 62½¢ little has been done, and the demand for crude products generally is on a very small scale. In the manufactured products there is a fair jobbing movement, chiefly at former prices. The leaning of prices is more or less in buyers' favor.

Spirits Turpentine. — A somewhat better business has been done, but the movement of supplies is not above the average, and prices have undergone very little change. During the week prices have not varied much from 30¢ for machine or original barrels.

Simplex Cork Puller.

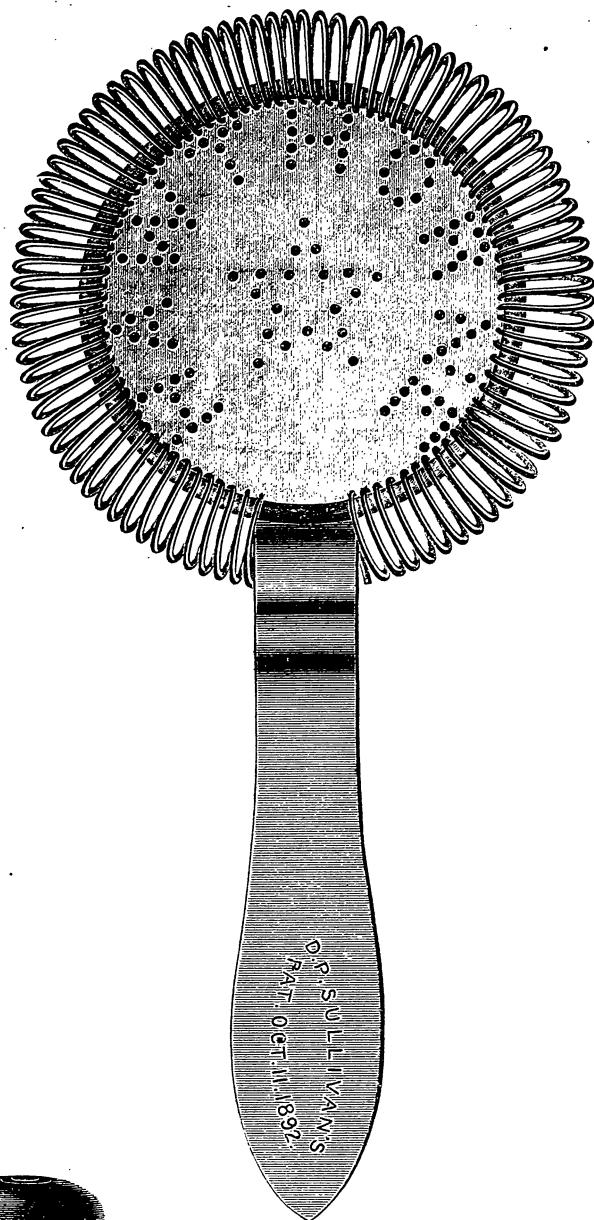
The illustration herewith shown represents a cork puller introduced by Manning, Bowman & Co., Meriden,



Simplex Cork Puller.

Conn., and 57 Beekman street, New York. The construction of the cork puller, which is nickel plated, is shown in the cut, the parts on which the

strain comes are roller bearing to reduce the friction to a minimum. The puller is simple, having no cogs or levers; and it is impossible, it is stated,



Hawthorne Julep Strainer.

to get it out of order. It is claimed that bottles cannot be broken when using the puller, as the cork revolves while it is being drawn. The wire is cut, the cork drawn and thrown off the worm automatically simply by turning the crank. The manufacturers claim that the puller requires little room in which to operate it, as it is smaller than other machines; that it takes one-third the power to operate it, and that it is positively noiseless in operation.

Hawthorne Julep Strainer.

Manning, Bowman & Co., Meriden, Conn., and 57 Beekman street, New York, are introducing a strainer as illustrated herewith. It is made of brass, silver plated, the perforations forming the word Hawthorne. The wire coil is of brass, silver plated, and slips under the rim around the body of the strainer. It may be released in a moment, cleansed of any fruit seeds or shreds, and as readily replaced. The handle is shaped so as to fit over a glass and to be held conveniently by the hand. The strainer is designed to instantly fit any glass, as the wire coil when pressed on the glass assumes an upright position, standing nearly the height of the diameter of the coil.

The Stevens Ideal Rifle.

J. Stevens Arms & Tool Company, Chicopee Falls, Mass., are offering an 1894 model rifle, as shown in the accompanying cuts. The arm possesses compactness and portability, the barrels being detachable, permitting packing into a small compass, the detaching and assembling of the arm being accomplished expeditiously without the aid of tools. The arm is described as having a solid frame in one piece with no side plates, having straps running back from the frame, which are let into the wood of the stock, the straps being firmly secured to the stock by screws. The arrangement of the rifle is such that several barrels of different calibers may

be saving much handling, the washer being always with the bolt. The same firm are also introducing the track bolt to stretch until a strain of about 20,000 pounds is reached, and that the stretch of the bolt before breaking is about $\frac{1}{8}$.

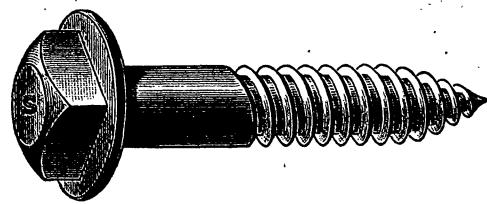


Fig. 1.—Combined Lag Screw and Washer.

shown in Fig. 2. The bolt is made of soft steel, and the threads are raised above the body of the bolt by cold

inch. The bolt can be made with any style thread required. Fig. 3 represents a steel boiler bolt being introduced by

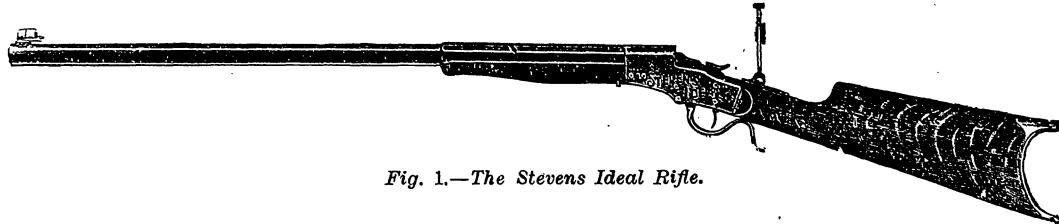


Fig. 1.—The Stevens Ideal Rifle.

be fitted into one action, thus securing several guns in one, greatly reducing the cost, it is explained, to one wishing different calibers and permitting the use of the same gun for different purposes. The arm is made in .22, .25, and .38 calibers, any or all of the barrels to interchange and to be used in one frame. The barrel connects with the stock immediately in front of the frame, as in Fig. 2, the barrels of all calibers, except the .22, being threaded into the frame, but turning easily, it is stated, so as to be taken out or put in with the hands. To load, the lever is thrown down, the cartridge inserted, the action closed by bringing the lever back, the arm cocked and fired. To detach the barrel the lever is thrown down, the screw forward

pressure under a new process. The makers state that the bolt has about 50

the firm. The bolt is intended for use by boiler makers as a "fitting up" bolt,

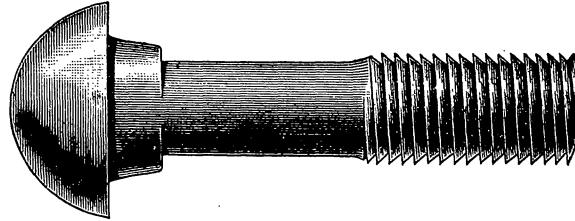


Fig. 2.—Soft Steel Track Bolt with Raised Thread.

per cent. greater tensile strength than an iron cut thread bolt of the same size, and is actually stronger in the threaded

and is made of soft steel with very coarse threads, so that the nuts can be run off quickly by hand. The shape of the neck, it is claimed, is another advantage. The bolt is made with a cone-point, and fitted with the firm's patent recessed nut, which nut has a recess in its bearing face a little greater in diameter than the bolt, so as to inclose or house the bolt threads and protect them from injury by the chafing of the plates when in service.

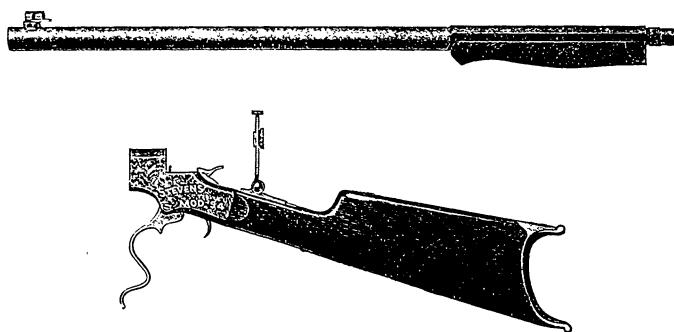


Fig. 2.—Stevens Ideal Rifle Apart.

of the frame loosened and the barrel is then drawn forward through the frame. In Fig. 1 a No. 109 or No. 110 arm assembled is shown, which is made with half octagon barrel, wind gauge front and mid range vernier back sight, varnished fore end and stock, case hardened frame and nickel plated Swiss butt plate.

Special Screws and Bolts.

In Fig. 1 of the accompanying illustrations is shown a new lag screw which J. H. Sternbergh & Son, Reading, Pa., are putting on the market. The washer is described as being forged on to the lag screw solidly, thus making a lag screw and washer in one piece. It is remarked that this combination will be appreciated by consumers and shippers

portion than in the shank, as repeated tensile tests have proved. The thread is so raised or spun up as to make the

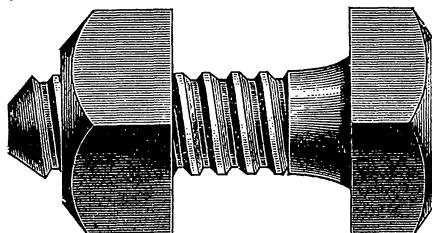


Fig. 3.—Steel Boiler Bolt with Cone Point.

diameter of the threaded portion about $\frac{1}{16}$ inch greater than the shank. They also state that the bolt will not begin

R. B. MILLER & Co. have established an agency at Lansing, Mich., for Manufacturers' and Builders' Supplies. Their business will be conducted on a commission basis. They have perfected arrangements for representing the following among other concerns: J. E. Bolles & Co. of Detroit, Mich.; Russell Wheel & Foundry Company of Detroit, Mich.; Dearborn Foundry Company of Chicago, Ill.; S. C. Johnson, Racine, Wis.; Kellogg Iron Works, Buffalo, N. Y.; James A. Miller & Bro., Chicago, Ill.; National Sheet Metal Company, Jersey City, N. J.; Thorn Shingle & Ornament Company, Philadelphia, Pa. But little stock will be carried, the greater part of their work being secured from plans and specifications. A full line of samples will, however, be carried.

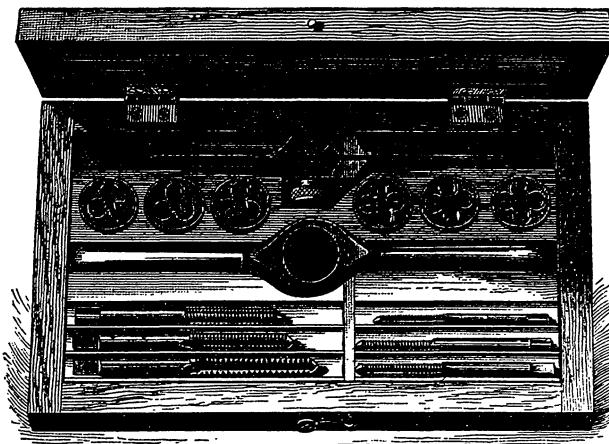
C. L. MUNGER, 142 Lake street, Chicago, has been appointed general sales agent for the Western territory for the W. E. Thayer Mfg. Company, Williamsburg, Mass., who are widely known as manufacturers of Screw Drivers and small Tools. Mr. Munger will carry a stock of these goods at his storerooms, from which orders will be promptly filled.

Columbian Screw Plate.

Alfred Ely & Co., Baltimore, Md., are placing on the market the screw plate as shown in the accompanying illustration.

The dies, which are $\frac{1}{8}$ inch in diameter, are described as being made solid from the finest grade of tool steel, but

to use Nos. 1, $1\frac{1}{2}$, 2, or $2\frac{1}{2}$ primers, as desired. The bullets used are of 55 and 48 grains, which may be cast, it is stated, in the molds made by the Ideal Mfg. Company, New Haven, Conn. The point is made that with a charge of from 16 to 20 grains of powder, the 55 and 48 grain bullets, as well as the ordinary 45-grain bullet, may be made to spin well and to give increased

*Columbian Screw Plate.*

split on one side to allow of adjustment in case of wear, or where over or under sizes are to be cut, the die, it is explained, having enough elasticity to return to original size should it be desired. The die holder is made from steel, case hardened to prevent undue wear, and in its outer edge three screws are set, by means of which the die is held in position and also adjusted as occasion may require. The adjustable tap wrench, which is shown in the cut, is drop forged from tool steel hardened and well finished. One side is split part way and sprung out so that in connection with the two square holes in the center and the small knurled thumb screw all sizes of taps can be quickly and firmly held for use, giving a large bearing surface on the square of the tap end. This set is furnished complete in a hardwood box, with adjustable tap wrench, die holder, taps and dies to cut four, five, six or seven sizes, the range being from $\frac{1}{16}$ to $\frac{1}{4}$ inch by $\frac{1}{32}$ inch, and all machine screw numbers from 1 to 14, in a great variety of threads, the assortment at present consisting of nearly 100 different sizes, which will be added to as the demands warrant. The screw plate is designed for the special use of machinists, tool makers, model makers, bicycle repairers and like trades requiring accurate tools of this description, with a large range.

Harwood's Hornet Cartridge.

The accompanying illustration represents a .22-20 central fire cartridge, being put on the market by R. Harwood, Somerville, Mass. The shell is described as made on the same lines as

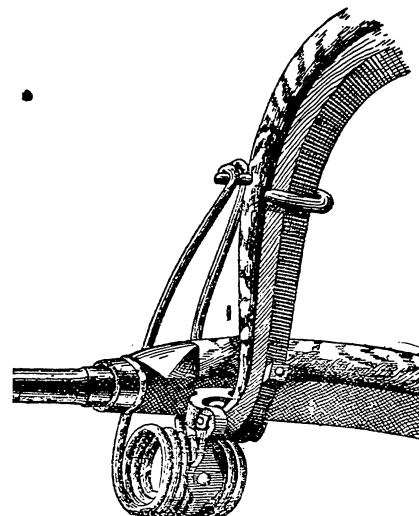
*Harwood's Hornet Cartridge.*

the .22-20 central fire, but drawn down a little at the mouth to take a bullet of smaller caliber. The shell holds about 20 grains of powder, and will be made

ings being covered with rubber so as not to deface the bathtub molding. The seats are also made with the metal work enameled, instead of being finished as described. Other styles are made to order with adjustments on the sides to raise or lower the seat, with a tilting seat board made of any kind of wood desired, or of aluminum or rubber. The seats are designed to fit any style of bathtub and for all kinds of bathing. They are referred to as convenient for foot baths, hip, vapor or sitting baths, and as especially adapted to the use of invalids.

The Star Coil Spring Shaft Support.

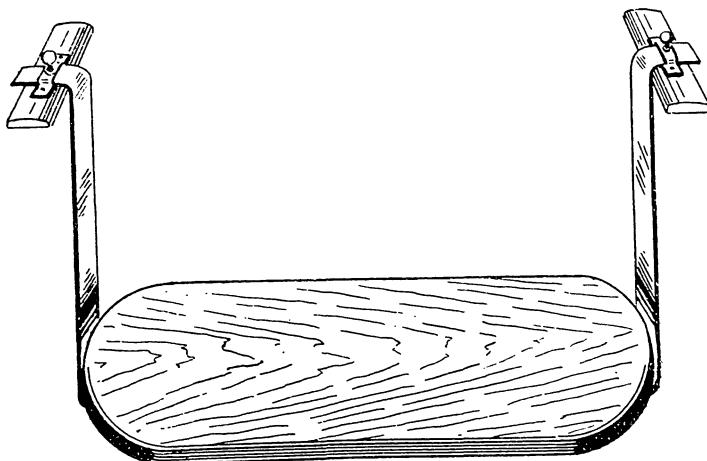
The Decatur Shaft Support Company, Decatur, Ill., are manufacturing the

*The Star Coil Spring Shaft Support.*

Adjustable Bathtub Seat.
St. Louis Bronze & Aluminum Works, 3741-3743 North Broadway,

power for game shooting. Many barrels now using the .22 caliber long rifle and .22-7-45 caliber cartridges may, it is stated, be made to handle the .22-20 caliber shell by rechambering. We are advised that the J. Stevens Arms and Tool Company, Chicopee Falls, Mass., are expecting in the near future to adapt their '94 model rifle, an illustration of which appears in this issue, to use the .22-20 cartridge.

device which is herewith illustrated. It consists of a strong coiled spring attached to the under side of the carriage axle and connected above with the

*Adjustable Bathtub Seat.*

St. Louis, Mo., are offering an adjustable bathtub seat, as shown herewith. The hanging bar upon which the seat

shafts. The spring is sufficiently strong to support the weight of the shafts and thus relieve the horse of that much of his burden. In addition to this excellent service it is also an effectual preventive of rattling, and, besides, it saves bracing or propping up the shafts. The point is further made that in case of a runaway and the breaking of the harness the shafts do not drop to the ground and cause a wreck.

The Benbow Mfg. Company, St. Louis, Mo., are sending out a four-page circular describing their Columbian

rests is made of polished steel, nickel plated, the clamps are of cast brass, nickel plated, and the seat and bearings of oil finished ash, the bottom of the bear-

washer, which is self heating. The jobbing trade are now handling this machine and dealers throughout the country are referred to as also becoming interested. The circular also contains testimonials from those who have used this washer.

Rapid Acting Vises.

W. C. Toles & Co., 35 to 41 East Indiana street, Chicago, Ill., are introducing wood workers' vises as shown in the accompanying cuts. The vises are constructed of steel and iron, with an operating screw $1\frac{1}{2}$ inches in diameter, having a groove cut its entire

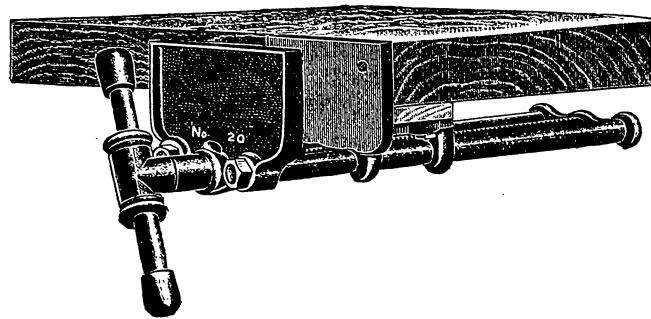


Fig. 1.—Rapid Acting Flush Vise No. 20.

length. This engages with a heavy sectional bronze nut, which, owing to its peculiar construction and operation, allows the threads on the screw, it is stated, to engage at any point, securely clamping the work and as rigidly as in an ordinary vise. When adjusting the jaws to the work in hand, the handle is brought to a stop, which brings the groove on the screw in alignment with the sectional nut and allows the jaws to be opened to 12 inches instantly. The No. 20 shown in Fig. 1 is a flush vise, designed particularly for the use of carpenters and cabinet makers. No. 30, Fig. 2, is a high vise, having a swivel jaw for holding taper or irregular work, and is intended for the use of pattern makers, also for car work, carriage makers' and other lines of wood work. The makers remark that it has been their aim to furnish wood workers with a vise that is as accurate as the rest of their kit of tools. It is claimed that the vises are constructed in the best possible manner ; that all working parts are ac-

steel disk spring represented in Fig. 2 by No. 2. The bolt No. 1, with a screw thread, runs through the disk spring into a threaded hole in the lower

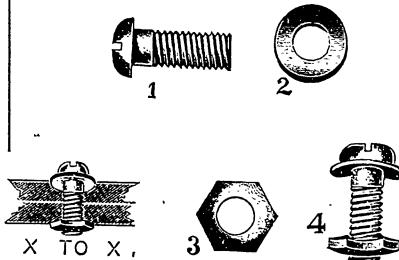


Fig. 2.—Parts of Tension Bolt.

blade, as in α to α , and is doubly secured by the six-sided brass lock nut No. 3. The three attachments before being fitted are shown by No. 4. It is explained that in opening and shutting the blades of the shear the spring moves

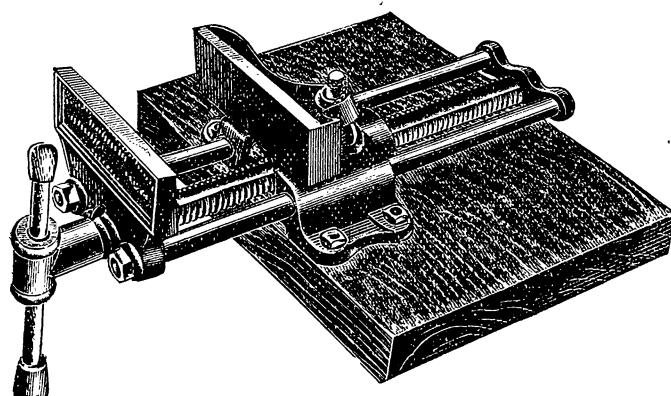


Fig. 2.—Rapid Acting Swivel Vise No. 30.

curately finished ; that the jaws are finished perfectly true and will securely clamp a sheet of writing paper ; that the jaws require no facing with leather or wood, and that they will not mar the finest quality of wood.

Tension Bolt Lock Nut Shear.

Henry Seymour Cutlery Company, Holyoke, Mass., are introducing the

claim that the slackness which is sometimes unavoidable in ordinary shears is hereby entirely obviated, and that the wear under the head of the bolt is taken

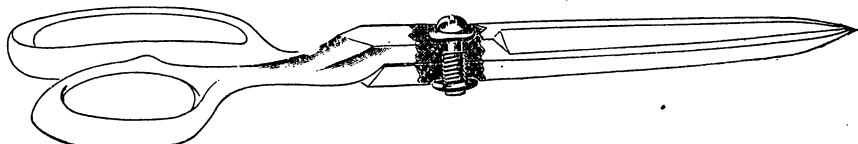


Fig. 1.—Tension Bolt Lock Nut Shear.

shear illustrated in Fig. 1. The shear is constructed with a hollow depression on the top of the blade to receive the

up by the automatic action of the regulation spring.

The Matchless Coffee Pot.

Hill & Whitney Mfg. Company, 149 Pearl street, Boston, are offering a coffee pot as shown herewith. It is made with a filter which can be raised or lowered by means of a chain attached to it,



Fig. 1.—The Matchless Coffee Pot.

and which can be removed. For filtering, common unbleached cotton cloth is used, torn or cut in squares about an inch larger than the cylinder bottom, and secured on the bottom of the filter by means of a screw cap. In use the filter is placed at the bottom of the pot as in Fig. 1, into which fine ground coffee is put, and on which is poured the desired quantity of boiling water. After the pot has stood on the stove seven to ten minutes the filter is raised as in Fig. 2, and suspended by catching the hook on the chain over the rim of the pot. As soon as the liquid has passed from

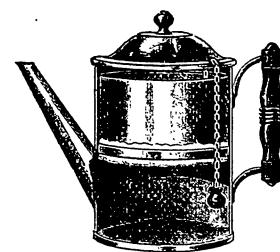


Fig. 2.—Filter in Coffee Pot Raised.

the filter, which requires two or three minutes, the coffee is considered ready for use. The advantages claimed for the process of first steeping and then filtering the coffee are as follows: That the grounds and water are quickly and perfectly combined and remain together steeping as long as is desired ; that in the use of a filter practically of as large an area as the pot a close texture of cloth can be used, permitting the use of fine ground coffee, resulting in economy of time and material and the production of a clear extract, and that by daily renewals of the filter at a cost of from $\frac{1}{2}$ to $\frac{1}{4}$ cent for each cloth, a uniform and excellent beverage is always obtained, free from all disagreeable taint. The manufacturers state that the pot is also especially adapted to making tea.

Checks, Door—	
Unity	.50%
Chisels—	
Socket Framing and Firmer Mix.	
Ohio Tool Co.	75&10@80%
Witherby	
Buck Bros.	.30%
Charles Buck	.30%
Douglas	.75&75@10%
Merrill	.60&10@60&10@5%
L & I. J. White	.30@30&5%
Tanged and Miscellaneous—	
Buck Bros.	.30%
Charles Buck	.30%
Butchers	\$1.75@35.00 to \$2
Spear & Jacksons	.35 to \$2
Tanged Firmers	.50@50@10%
Cold Chisels, fair quality, # D.	.14@16%
Chucks—	
Beach Pat.	each, \$8.00 .20%
Danbury	each, \$6.00-\$8.00@30&5%
Graham Patent	.33@4%
Morse's Adjustable, each	\$7.00-\$20@20&5%
Syracuse, Bals Pat.	.25%
Skinner Patent Chucks.	
Combination Lathe Chucks	.40%
Drill Chucks	.25%
Independent Lathe Chucks	.40%
Planer Chucks	.20%
Universal Lathe Chucks	.40%
Union Mfg. Co.	
Combination	.40%
Independent	.40%
Universal	.40%
Victor	.88.50, 25%
Churns—	
McDonald Star Barrel Churn, each 6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25.	
Tiffin Union, each, 5 gal. \$3.25; 7 gal., \$3.75; 10 gal., \$4.25.	
Clamps—	
Adjustable Cincinnati	.15@10%
Adjustable Hammers	.15@15@5%
Adjustable, Stearn's	.30@30@10%
Jones' Machinists' Clamps	.33@4%
Cabinet, Sargent's	.70@10%
Carpenter, Cincinnati	.25@10%
Carriage Makers, P. S. & W. Co.	.40@10%
Carriage Makers, Sargent's	.75@75@5%
Eberhard Mfg. Co.	.40@60@10@10%
Jones' Clamps, Tatum's	.25@10%
R. I. Tool Co.'s Wrought Iron	.26@10%
Weld Clamps, see Vises, Saw Fliers.	
Stearn's malleable, with Wrought Iron Screw	
Warner's	.75@75@5%
Watson's	.40@10@40@10@5%
Cleavers, Butchers'—	
Beatties	.10@40@5%
Bradley	.25@30%
Foster Bros.	.30%
New Haven Edge Tool Co.	.10%
Nichols Bros.	.30%
P. & W.	.33@4@5@33@4@10%
Schulte, Lohof & Co.	.40@10@5%
L. & J. White	.20@5%
Clips—	
Baker Axe Clips	.25%
Norway, Axe, # 4 & 6-16	.55@50@5%
Norway Spring Bar Clips	.60@65@5%
2d grade Norway Axe # 4 & 6-16	.65@5%
Steel Police Clips	# D, .42@5%
Superior Axe Clips	.70@5%
Wrought Iron Feloe Clips	# D, .50@5%
Cloth and Netting, Wire—	
—See Wires, &c.	
Cockeyes—	.50%
Cocks, Brass—	
Hardware list (Globe, Kerosene, Lever Bibbs, Racking, &c.)	.60@2@60@10%
Coffee Mills—	—See Mills, Coffee.
Collars, Dog—	
Bass, Pope & Steven's list	.40%
Chapman Mfg. Company, new list	.40%
Embossed Gilt, Pope & Steven's list	30@30@10%
Leather, Pope & Steven's list	.40%
Medford Fancy Goods Co.	.40@10@5%
Combs, Curry—	.33@4@4%
American Curry Comb Co.	.33@4@4%
Fitch's	.50@10@50@10@10%
Gibb's Magnetic	.30@ doz, \$2.00
Kohler's Humane	.30@ doz, \$1.75
Kohler's Magic Oscillating	.30@ doz, \$2.00
Rubber, per doz, \$1.00	.25%
Compasses, Dividers & C.—	
Common, Calipers, Dividers	70@10@75@
Bemis & Call Co.	
Dividers	.65%
Calipers, Cal's Patent Inside	.65%
Calipers, Double	.65%
Calipers, Inside or Outside	.65%
Calipers, Wing	.60%
Compasses	.50@5%
Excisor	.50%
Starrett's	
Combination Dividers	.25%
Lock Calipers and Dividers	.25%
Spring Calipers and Dividers	.25@10%
Stevens & Co.'s	.25@10%
Coolers, Water—	
S. S. & Co., gal. \$2.00; 3-gal., \$2.50; 4-gal., \$2.75; 6-gal., \$3.40 each	.33@4%
Coopers' Tools—	
—See Tools, Coopers'.	
Cord—	
Sash—	
Braided, Crown Drab and Fancy, # D, .55%	.30%
Braided, Crown White, # D, .50@ .50%	
Cable Laid Italian Sash	# D, 19@20%
Common	# D, .8@2@2%
Common Russia Sash	# D, 12@13@13@
Egyptian, India Hemp, Braided	.28%
India Cable Laid Sash	# D, 13@14@12@
Massachusetts, White	.22@24@
Ossawam Mills—	
Braided, Giant, Drab and Fancy, # D, 35@	.25%
Braided, Giant, White, # D, .30@ .20%	
Patent, good quality	# D, 10@11@
Patent Russia Sash	# D, 13@14@14@
Samson—	
Braided, Drab Cotton	# D, .42
Braided, Italian Hemp	# D, .40@
Braided, Linen	# D, .50@
Braided, White Cotton	# D, .37@
Temper Idem Braided, White	.26@
Silver Lake—	
A quality, Drab	.25%
A quality, White	.25%
B quality, Drab	.10@
B quality, White	.30@
Sylvan Spring, Extra Braided, Drab	.32@
Sylvan Spring, Extra Braided, Drab, Fancy	.34@
Tate's Solid Braided—	
Economy, Drab	# D, 27@
Economy, White	# D, 24@
Hercules, Drab	# D, .30@
Hercules, White	# D, .25@
White Cotton Braided, fair	# D, 23@24@
Wire Picture—	
Braided or Twisted	.30@5@80@15%
Corkscrews—	—See Screws, Cork.
Corn Knives and Cutters—	
—See Knives, Corn.	
Crackers, Nut—	
Acme	
Japanned, # gro. \$30	.50%
Nickel Plated, # gro. \$30	.10%
Blake's Pattern, # doz, \$2.00	.10%
Table (H. & B. Mfg. Co.)	.40%
Turner & Seymour Mfg. Co.	.50%
Cradles—	
Grain	.50@2@50@5@2%
Crayons—	
White Crayons, # gross	.7@8@
D. M. Stewart Mfg. Co.	
Metal Workers, # gross, \$2.50	.25%
Railroad, # gross	.20@ .25%
Rolling Mill, # gross	.25@ .25%
Soapstone Pencils, # gross, 1.50	.20%
See also Chalk.	
Creamery Pails—	—See Pails, Creamery.
Crow Bars—	—See Bars, Crow.
Curry Combs—	
See Combs, Curry.	
Cutters—	
Meat—	
American	.80%
Nos. 1 2 3 4 B	
Each	.35 .37 .38 .35 .36 .30
Enterprise	.25%
Nos. 10 12 22 32 42	
Each	.38 .25 .20 .18 .15
Dixon's, # doz	.40@40@5%
Nos. 1 2 3 4	
\$14.00 \$17.00 \$19.00 \$30.00	
Draw Cut, each	
Nos. 5 6 7 8	
.65@ .67 .68 \$22.50	
Hale's, # doz	.20@25%
Nos. 11 12 13	
.27@ .30@ .33@	
Home No. 1, # doz	.26@ .28@ .30@
Little Giant, # doz	.40@10@5%
Nos. 305 310 312 314 322	
\$35.00 \$45.00 \$42.00 \$37.00 \$30.00	
Miles' Challenge, # doz	.40@40@5%
Nos. 1 2 3	
.32@ .30@ .30@	
Triumph No. 505, # doz	.21.00 .24@ .28@ .30@
Woodruff's, # doz	.40@40@5%
Nos. 100 150	
.15@ .18@ .18@	
Chadborn's Smoked Beef Cutter, # doz	.80@8.00
Enterprise Beef Shavers	.20%
Tucker & Dorsey Mfg. Co.	
Kraut Cutters	.40%
Slaw Cutters, 1 Knife, # gross	\$21.00
Slaw Cutters, 2 Knife, # gross	30.00
Tobacco—	
Acme	.40@ doz, \$20.00 .40@
All Iron	# doz, \$4.25
Champion	.20@10@30%
Nashua Lock Co.'s, # doz	.18.00 .50@55%
National	.30@ doz, \$21.00 .30@
Sargent's	.40@ doz, \$24.00 .55@5%
Wilson's	
Washer—	
Appleton's	# doz, \$16.00 .60@10@10%
Bonney's	.30@ doz, \$10.00
Cincinnati	.25@10%
Johnson's	# doz, \$11.00 .33@4%
Penny's	# doz, Pol. \$14; Jap'd, \$16.50
Smith's Pat.	# doz, \$12.00 .20@10@10%
Diggers, Post Hole, &c.—	
Cronk's Post Bars, # doz	\$60.00
Eureka Diggers	.50@5@50@10@10%
Fletcher Post Hole Augers	# doz, \$36.00
Gem, Improved	# doz, \$9.00 @ \$10.00
Gibbs' Columbia	.30@ doz, \$12.00
Gibb's Hustler	.30@ doz, \$10.00
Gibb's Imperial	.30@ doz, \$7.50
Gibb's National	.30@ doz, \$12.00
Gibb's Post Hole Digger	.30@ doz, \$12.75
Kohler's Hercules	.30@ doz, \$14.00
Kohler's Invincible	.30@ doz, \$12.00
Kohler's Little Giant	.30@ doz, \$18.00
Kohler's New Champion	.30@ doz, \$8.00
Ryan's	.30@ doz, \$20.00 .25@10@10%
Samson	# doz, \$34.00 .25@20@10@10%
Schedler	.30@ doz, \$18.00
Shimer's Hollow Handle	.30@ doz, \$24.00
Vaughan's Post Hole Auger	# doz, \$8.50 @ \$9.50
Dividers—	—See Compasses.
Dog Collars—	—See Collars, Dog.
Door Checks—	—See Checks, Door.
Door Springs—	—See Sprung Door.
Drawers, Money—	
Money Drawers, # doz	.18@8@20@
Waddel's Improved	No. 1, # doz, \$15.00
Waddel's Improved	No. 2, # doz, \$18.00
Waddel's Comb.	Cutlery Case and Alarm Till
	.12@5@
Drawing Knives—	
—See Knives, Drawing.	
Drills and Drill Stocks—	
Bench Drills, Stearns'	.50%
Blacksmiths'	each \$1.75
Blacksmiths' Self-Feeding	each \$1.50 .20@
Automatic Boring Tools	# doz, \$1.75 @ \$1.85
Breast, Bartholomew's	each \$2.50
Breast, Miller's Falls	each \$3.00 .25@
Breast, W. S. & W.	.40@10@
Chicopee Automatic Drill	.20@10@
Goodell Automatic Drills	.40@5@40@10@10%
Ratchet, Curtiss & Curtis	.30@
Ratchet, Merrill's	.25@
Ratchet, Moore's Triple Action	.25@20@30@
Ratchet, Parker's	.20@20@8@
Ratchet, Weston's	.20@25@
Whitney's Hand Drill, Plain	.11@10@
Adjustable	.12@10@ .20@10@
Twist Drills—	
Cleveland	.50@10@10@
Diamond, W. & B.	.60@10@10@
Graham's Pat. Groove Shank	.50@10@10@
Goodell's Royal Drills (Seconds)	.75@
Other makers, best brands	.70@5@70@10@10%
Second quality	.80@8@10@10@
Arcade Horse Raspas	.50@10@10@10@
Chelsea Horse Raspas, Hand Cut	.50@10@10@
Heller's Horse Raspas	.50@10@10@10@
Trojan Horse Raspas	.60@10@10@
Imported—	
Butcher	—Butcher's List, 20@
Stubbs	—Stubbs' List 25@30@
Fixtures Grindstone—	
Moore's	.55%
P. S. & W. Co.	.50@10%
Reading Hardware Co.	.50@10%
Sargent's Patent	.50@10%
Fluting Machines—	
See Machines, Fluting.	
Fodder Squeezers—	
See Squeezers, Fodder.	
Forks—	
Bay, Manure, &c. Assn. List	70@70@5@5%
Bay, Manure, &c. Phila. List	60@60@10@10@5%
Plated, see Spoons.	
Frames—	
Saw—	
Red, Polished and Varnished	# doz, \$1.50, 25@
White Vermont	# gro. \$9.00 @ \$10.00
Screen, Window and Door—	
Bonanza Window Screens	.50@5@10@10%
Cortland	.40@40@5@5%
Empire Fancy Screen Doors	# doz .51@
Phillips' Window Screen Frames	.50@5@5@5%
Porter's Pat. Window and Door Frame	.50@5@10@10%
Stearns' Frames and Corners	.25@2@10@10%
Wabash Adjustable Window Screen	.40@5@5%
Warner's Screen Corner Irons	.33@4@10%
Freezers, Ice Cream—	
American	.60%
Arctic	.70@70@2@2%
Ellrich's Socket and Ratchet	.25@25@10@10%
Fray's Hol. Die Sets	.12@12.00 .45%
Gay & Parsons	.85%
Goodell's Automatic	.50@5@5@5%
Knapp & Cowles	
No. 1	.70@10@
No. 2	.70@10@
No. 3	.60@10@
Nos. 4 and 6, Acme and Ideal	.60@10@
Kolb's Common Sense	.50@ doz, \$6.00
Distion's	.25@10@
Douglas Mfg. Co.	.50@2@10@10%
Ellrich's Socket and Ratchet	.25@25@10@10%
Fray's Hol. Die Sets	.12@12.00 .45%
Gay & Parsons	.85%
Goodell's Automatic	.50@5@5@5%
Porter's Pat. Window and Door Frame	.50@5@10@10%
Stearns' Frames and Corners	.25@2@10@10%
Wabash Adjustable Window Screen	.40@5@5%
Warner's Screen Corner Irons	.33@4@10%
Fruit Freezers—	
American	.60%
Arctic	.70@70@2@2%
Blizzard	.70%
Stanley R. & L. Co.'s	
No. 64, Varnished Handles	.65@10@10%
No. 86	.70@10@
Stearns'	.25@2@10@10%
C. T. Williamson Wire Novelty Co.	.50@5@5@5%
Egg Beaters—	—See Beaters, Egg.
Egg Poachers—	—See Poachers, Egg.
Electric Bell Sets—	—See Bells, Electric.
Emery—	—No. 4 to No. 54 to Flour, CF
Emery—	.45 gr. 150 gr. F.F.F.
Kers, # D.	.45@45@ 5@5@ 5@5@
X/2 Eggs, # D.	.45@45@ 5@5@ 5@5@
1/2 Eggs, # D.	.45@45@ 5@5@ 5@5@
10-# cans, 10-	.5@5@ 5@5@ 5@5@
10-# cans, Corn, 10-	.5@5@ 5@5@ 5@5@
10-# cans, less	.5@5@ 5@5@ 5@5@
than 10-. 10-#	.5@5@ 5@5@ 5@5@
10-# cans, less	.5@5@ 5@5@ 5@5@
than 10-. 10-#	.5@5@ 5@5@ 5@5@
Enameled and Tinned Ware—	—See Ware, Hollow.
Escutcheon Pins—	—See Pins, Escutcheon.
Escutcheons—	
Brass Thread	.60@60@10@10%
Door Lock	—Same dis. as Door Locks.
Wood	.25%
Expanded Metal—	
List No. 5	
Door Mats, Galvanized	.25%
Fencing, Painted Sheets	.20%
Lathe	.10%
Netting, Painted Sheets	.20%
Tree Guards, Panelized	.15%
Window Guards, Panelized	.15%
Extractors, Lemon Juice—	—See Squeezers, Lemon.
Fasteners, Blind—	
Austin & Eddy No. 2008	.5 gr. \$9.00; No. 4 .10@
Mackrell's	# doz, \$1.00 .20@20@10@70@
Security Gravity	.5 gr. \$9.00
Van Sand's Old Pat.	.15@ .55@10@
Van Sand's Screw Pat.	.15@ .5 gr. .60@10@
Zimmerman's	.50@10@
Faucets—	
B. & L. Co.	
West's Lock, Open and Shut Key	.50%
Burnside's Red Cedar	.50%
Burnside's Red Cedar, bbl. lots	.50@10@
Cork Lined	.50@10@
Fenn's	.40%
Fenn's Cork Stops	.33@4%
Frary's Pat. Petroleum	.60@10@10@
Metallic Key, Leather Lined	.60@10@10@
Self Measuring	
Enterprise	.25@10@10@
Lane's	.25@10@10@
Star	.25@10@10@
Lockport, Metal Plug, reduced list	.60@4@
National Measuring	.36.00 .25@10@10@
Peerless Best Block Tin Key	.40%
IXL, 1st Quality, Cork Lined	.50%
Diamond Lock	.40%
Perfection Fla. Red Cedar (in boxes)	.40%
Boss Metallic Key	.50%
Reliable Cork Lined	.50%
O. K. Western Pattern Cork Lined	.50%
No Brand, Red Cedar (in bbls.)	.60@10@
Western Pattern Metal Key	.40%
No Brand Metal Key	.50%
Self Measuring	
Enterprise	.25@10@10@
Lane's	.25@10@10@
Star	.25@10@10@
Tlockport, Metal Plug, reduced list	.60@4@
Nicholson (X.F.) Files	.25@
Nicholson's Royal Files (Seconds)	.75@
Eagle	.60@10@10@70@5@
Nicholson Files, Rasps, &c.	.60@10@10@10@

Halters—

Cover's Adj. Rope Halters..... 40²⁵
 Cover's Adj. Web Halters..... 35⁵⁵
 Cover's Hemp Horse and Cattie Ties..... 50¹⁰
 Cover's Jute Cattie Ties..... 70²⁵
 Cover's Jute Horse Ties..... 70²⁵
 Cover's Rope, 7-16 in., Jute..... 70²⁵
 Cover's Rope, 14 in., Hemp..... 50²⁵
 Cover's Rope, Jute..... 60¹⁰
 Cover's Saddlery Works Halters..... 83¹⁵
 Cover's Saddlery Works Handy Web
 Halters..... 83¹⁵
 Cover's Saddlery Works Horse and
 Cattie Ties..... 33⁴⁵

Hammers—

Handled Hammers—
 Atha Tool Co.
 Buffalo Hammer Co.
 Humason & Beckley. 50¹⁰
 Verrier.
 Cheney's Claws. 40¹⁰
 Cheney's Machinists' & Riveting. 50²⁵
 O. Hammond & Son. 40¹⁰
 Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 &
 1.75
 Maydole's, list Dec. 1, '86. 25¹⁰
 Nelson Tool Works. 40¹⁰
 Peck, Stow & Wilcox. 35⁴⁰
 Fayette R. Plumb.
 Artisans' Choice, A. E. Nall. 40¹⁰
 Horseshoe Turning Hammers. 50¹⁰
 Regular Y. & A. E. Nall. 50¹⁰
 Other Hammers. 50¹⁰
 Sargent's. 40¹⁰
 Warner & Nobles, new list. 25²⁰

Heavy Hammers and Sledges—

8 lb and under. 25¹⁰
 8 to 5 lb. 30³⁵ 75¹⁵
 Over 5 lb. 30³⁵

Wilkinson's Smiths. 10¹⁵
 Handcuffs and Leg Irons
 —See Police Goods.

Handles—

Cross-Cut Saw Handles—
 Atkins', new list. 40¹⁰
 Champion. 15¹⁵
 Ely's Perfection. 35¹⁰
 Semple. 40¹⁰

Iron, Wrought or Cast—
 Barn Door, W. \$1.40. 10¹⁰
 Bronze Iron Drop Latches. W. doz 70¢ net
 Chest and Lifting. 70¹⁰
 Door or Thumb.
 Nos. 0 1 2 3 4
 Per doz. \$0.80 1.00 1.08 1.35 1.50
 60¹⁰
 Jap'd Store Door Handles—Nuts. 1.62;
 Plate. \$1.10; no plate, \$0.88. 1.62
 Roggin's Latches. W. doz 80¢³⁵

Wood—

Auger, assorted. 5 gr 50¢
 Auger, large. 5 gr 7.00 50¹⁰
 File, assorted. 5 gr 2.75 50¹⁰
 Brad Awl. 5 gr \$2.00
 Apple Firmer Chisel, ass'd. 5 gr 5.00
 Apple Firmer Chisel, large. 5 gr 6.00
 Hickory Firmer Chisel, ass'd. 5 gr 4.50
 Hickory Firmer Chisel, large. 5 gr 5.00
 Socket Firmer Chisel, ass'd. 5 gr 8.00
 Socket Framing Chisel, ass'd. 5 gr 5.00
 Chisel, Fibre Head. 33⁴⁵
 Hammer, Hatchet, Axe, &c. 40¹⁰
 Hoe, Rake, Shovel, &c. 60¹⁰
 Pat. Auger, Douglass. W. set \$1.25
 Pat. Auger, Ives'. 30¹⁰
 Pat. Auger, Swan's. 35¹⁰
 Saw and Plane. 40¹⁰
 J. B. Smith & Co.'s Pat. File. 50¹⁰

Hangers—

Barn Door, New England. 70¹⁰
 Barn Door, old patterns. 70¹⁰
 Barry. 50¹⁰
 Bes. Anti-Friction. 60¹⁰
 Boss. 60¹⁰
 Carrier Steel Anti-Friction. 50¹⁰
 Champion. 60¹⁰
 Chicago Anti-Friction. 30¹⁰
 Oliver Anti-Friction. 55¹⁰
 Cincinnati Nos. 1, \$2.25; 3, \$2.50; 4,
 \$2.50
 Crescent. 60¹⁰
 Cronk's Patent, Sheet Covered. 50¹⁰
 Duplex (Wood Track). 60¹⁰
 Economy, \$6.00. 50¹⁰
 Hamilton Wrought Steel Track. 55¹⁰
 Interstate. 50¹⁰
 Kidder's. 50¹⁰
 Lane's New Standard. 60¹⁰
 Lane's Parlor. 40¹⁰
 Lane's Standard. 50¹⁰
 Lane's Standard. 50¹⁰
 Lundy, Steel Parlor. 40¹⁰
 Magic. 45¹⁰
 Moore's Baggage Car Door. 55¹⁰
 Moore's Elevator. 55¹⁰
 Moore's Railroad. 55¹⁰
 Nickel, Steel, Nos. 0, \$2.25; 1, \$2.00; 2, \$1.50;
 40¹⁰
 Orleans Steel. 55¹⁰
 Paragon Nos. 5, 6, 7 and 8. 20¹⁰
 Pendulum, Payson's. 40¹⁰
 Perfection. 50¹⁰
 Richards'. 30¹⁰
 Samson Steel Anti-Friction. 55¹⁰
 Star. 40¹⁰
 Stearns' Anti-Friction. 20¹⁰
 Stearns' Challenge. 25¹⁰
 Sterling. 50¹⁰
 Terry's Ideal. 50¹⁰
 Terry's Modern. 50¹⁰
 Terry's Shield. 50¹⁰
 Terry's Solid. 50¹⁰
 Terry's Wrought Single Strap. 50¹⁰
 Victor, No. 1, \$1.50; No. 2, \$1.60; No.
 3, \$1.80. 50¹⁰
 Warner's Pat. 20¹⁰
 Wild West. 45¹⁰
 Zenith for Wood Track. 55¹⁰

Harness Snaps—

Hatchets—
 American Axe and Tool Co.
 Blood's.
 Hunt's. 40 & 10
 Hurd's. @ 10
 Mann's. 40 & 10
 Underhill's. & 55
 O. Hammond & Son.
 Fayette R. Plumb.
 Collins. 10¹⁰
 Buffalo Hammer Co.
 Kelly's.
 P. S. & W. Co. 50 @ 50
 Sargent's & Co. & 10¹⁰
 Schutte, Leiboff & Co.
 Ten Eyck Edge Tool Co.

Hay and Straw Knives

See Knives.

Hinges—

Clark's
 Nos. 1, 2, 3, 5, 1886, Old Pattern.
 Blind Hinges—
 Nos. 1 and 3, Tip Pattern. 75¹⁰
 Buffalo. 50¹⁰
 and 65. 75¹⁰
 Buffalo Reversible, Nos. 3, 2, 16, 1, 0,
 1 and 0. 70²⁵
 No. 1 Cottage, for wood only. 80¹⁰
 No. 1 Diamond, for wood only. 80¹⁰
 Dixie L. & P., Nos. 3, 24, 2, 16, 1, 0,
 0, 4 and 6. 75¹⁰
 No. 25 Empire, Reversible. 75¹⁰
 Lull & Porter, Nos. 3, 24, 2, 16, 1, 0,
 4 and 5. 75¹⁰
 Mortise Gravity, Nos. 2, 4, 4, 6, 8, 9,
 and 10. 50¹⁰
 Parker. 75¹⁰
 North's Automatic Blind Fixtures, No.
 2, for Wood. 20¹⁰; No. 3, for Brick.
 \$1.15. 10¹⁰
 Drawing's Gravity. 75¹⁰
 Sargent's Nos. 3, 5, 11, 12, 18.
 75¹⁰
 Gate Hinges—
 Automatic. W. doz \$12.50, 50¹⁰
 Clark's, Nos. 1, 2, 3. 60¹⁰
 60¹⁰
 N. E. Reversible. W. doz \$5.60, 60¹⁰
 N. Y. State. W. doz \$4.90, 60¹⁰
 Western. W. doz \$4.20, 60¹⁰

Spring Hinges—

Acme. 80¹⁰
 American. 20¹⁰
 Bardissi's Patent Checking. 15¹⁰
 Barker's Double Acting. 25¹⁰
 Bommer's Japanned. 35¹⁰
 Bommer's All other Kinds. 30¹⁰
 Buckman's. 15¹⁰
 Champion. 60¹⁰
 Columbia. 30¹⁰
 Crown. 20¹⁰
 Devore, No. 1. 5 gr, \$1.20
 Freepart. 5 gr, \$1.20
 Geer's Spring and Blank Butts. 40¹⁰
 Gem. 20¹⁰
 Ideal No. 3. 5 gr gross \$8.00
 J. G. C. Covered. 50¹⁰
 Knockall. 50¹⁰
 New Idea No. 1. 5 gr gross \$10.00
 New Idea No. 2. 5 gr gross, \$18.00
 New Idea Dbl. Acting. 45¹⁰
 No. 10 Matchless. 60¹⁰
 No. 25 Breakable. 60¹⁰
 Oxford. 20¹⁰
 Reliable. 60¹⁰
 Rex. 50¹⁰
 Royal. 60¹⁰
 Samson. 60¹⁰
 Stearns' Noiseless Floor Hinge.
 W. set \$6.00. 20¹⁰
 Surprise. 50¹⁰
 Union Mfg. Co. 25¹⁰
 Spring Union Spring Hinge Co.'s list.
 March, 1886. 20¹⁰
 Wiles', No. 1, 5 gr, \$16; No. 2, \$13

Wrought Iron Hinges—

First February 14, 1891.
 Scrap and T. 60¹⁰
 Strap and T. 60¹⁰
 Plate Hinges, 8, 10 & 12 in. 50¹⁰
 " Providence" over 13 in. 50¹⁰
 Rolled Blind Hinges, Nos. 32 and 34.
 50¹⁰
 Rolled Blind Hinges, Nos. 232 and 234.
 55¹⁰
 Rolled Plate. 70¹⁰
 Rolled Raised. 70¹⁰
 Screw Hook and Eye. 5 in. 50¹⁰
 5 in. 50¹⁰
 Screw Hook and Eye. { 6 to 12 in. 50¹⁰
 14 to 20 in. 50¹⁰
 Strap. 22 to 36 in. 50¹⁰

Hoes—

Eye—
 Scovil and Oval Pattern. 50¹⁰
 D. & H. Scovil. 20¹⁰
 G. Scovil. 60¹⁰
 Lane's Crescent, Planters' Pattern. 45¹⁰
 Lane's Razor Blade, Scovil Pat. 30¹⁰

Handled—

Garden, Mortar, &c. 70¹⁰
 Magic. 50¹⁰
 Planter's, Cotton, &c. 70¹⁰
 Raking Hoe. 60¹⁰
 Matchless. 50¹⁰
 Moody. 45¹⁰
 Moore's Baggage Car Door. 55¹⁰
 Moore's Elevator. 55¹⁰
 Moore's Railroad. 55¹⁰
 Nickel, Steel, Nos. 0, \$2.25; 1, \$2.00;
 40¹⁰
 Orleans Steel. 55¹⁰
 Paragon Nos. 5, 6, 7 and 8. 20¹⁰
 Pendulum, Payson's. 40¹⁰
 Perfection. 50¹⁰
 Richards'. 30¹⁰
 Samson Steel Anti-Friction. 55¹⁰
 Star. 40¹⁰
 Stearns' Anti-Friction. 20¹⁰
 Stearns' Challenge. 25¹⁰
 Sterling. 50¹⁰
 Terry's Ideal. 50¹⁰
 Terry's Modern. 50¹⁰
 Terry's Shield. 50¹⁰
 Terry's Solid. 50¹⁰
 Terry's Wrought Single Strap. 50¹⁰
 Victor, No. 1, \$1.50; No. 2, \$1.60; No.
 3, \$1.80. 50¹⁰
 Warner's Pat. 20¹⁰
 Wild West. 45¹⁰
 Zenith for Wood Track. 55¹⁰

Holding Apparatus—

See Machines, Holding.

Hollow-Ware—

See Ware, Hollow.

Holders—

Bag—
 Sprangle's Pat. W. doz \$18... 80¹⁰

Bit—

Angular. W. doz \$24.00, 40¹⁰
 Diagonal. W. doz \$24.00, 40¹⁰

Extension—

Barker's. W. doz \$15.00. 40¹⁰
 Ives. W. doz \$20.00. 60¹⁰
 60¹⁰

File and Tool—

Balt. Pat. W. doz \$4.00, 25¹⁰
 Nicholson File Holders. 20¹⁰

Sash—

Motley's Adj. Sash, Medium Size.
 W. doz \$1.20, 40¹⁰

Hooks—

Cast Iron—
 Bird Cage, Reading. 30¹⁰
 Bird Cage, Sargent's List. 30¹⁰
 Clothes Line, Sargent's List. 55¹⁰
 Ceiling, Sargent's List. 55¹⁰
 Clothes Line, Moore's. 70¹⁰
 Clothes Line, Reading List. 60¹⁰
 Coat and Hat, Moore's. 70¹⁰
 Coat and Hat, Reading. 70¹⁰
 Coat and Hat, Sargent's List. 55¹⁰
 Hammock, E. C. Stearns & Co. W. doz
 60¹⁰
 Harness, Reading List. 55¹⁰
 55¹⁰

Wire—

Atlas, Coat and Hat. 65¹⁰
 Belt. 80¹⁰
 Handy Hat and Coat. 50¹⁰
 Indestructible Coat and Hat. 45¹⁰
 Steady Ceiling Hooks, List April 1886. 40¹⁰
 Wire Coat and Hat, Gem, list April, 1886. 60¹⁰
 Wire Coat and Hat, Miles, list April, 1886. 60¹⁰
 Bright Wire Goods—See Wire.

Wrought Iron—

Cotton. W. doz \$1.25
 Cotton Fat (N. Y. Mallet and Handle
 W's. 30¹⁰
 Tassel and Picture, T. & S. Mfg. Co. 50¹⁰
 Wrought Staples Hooks, &c.
 See Wrought Goods

Miscellaneous—

Bush. 55¹⁰
 Fish Hooks, American. 50¹⁰
 Fish, No. 2. 32¹⁰; No. 3. 32¹⁰; No. 4. 32¹⁰
 Hooks and Eyes—Brass. 60¹⁰
 Hooks and Eyes—Malleable Iron. 70¹⁰
 Nolin's Grass. W. doz \$2.25
 Whiffletree—Patent. 55¹⁰
 Bench Hooks—See Bench Stops.

Horse Nails—

See Nails, Horse.

Horse Shoes—

See Shoe, Horse.

Hose, Rubber—

Competition, Fair quality. 75¹⁰
 Competition, Low Grade, 5 in. 54¹⁰
 Standard. 60¹⁰
 N. Y. B. & P. Co., Carbon. 70¹⁰
 N. Y. B. & P. Co., Double Diamond. 60¹⁰
 N. Y. B. & P. Co., 1846 Para. 40¹⁰

Cotton Garden, 34 in., coupled:
 Fair Quality, 5 ft. 7¹⁰
 Good Quality, 5 ft. 8¹⁰

Huskers—

Blair's Adjustable. 5 gr \$8.00
 Blair's Adjustable Clipper. 5 gr 7.00
 Hubbard's Solid Steel. 5 gr 4.50

Indurated Fiber Ware—

See Ware, Indurated Fiber.

Irons. Curling—

Nicol's Patent Curling Iron Heater,
 3¹⁰ doz. \$1.00
 Silver Tipped Grace Darling Curling
 Iron. 50¹⁰

Indurated Fiber Ware—

See Ware, Indurated Fiber.

Irons. Curling—

Nicol's Patent Curling Iron Heater,
 3¹⁰ doz. \$1.00
 Silver Tipped Grace Darling Curling
 Iron. 50¹⁰

Sad—

From 4 to 10, at factory. 100¹⁰
 \$2.30¹⁰
 B. B. Sad Irons. 3¹⁰ doz. 30¹⁰
 Chinese Laundry (N.E. Butt Co.) 5¹⁰
 Chinese Sad. 3¹⁰
 Crown Improved. 60¹⁰
 Ideal Irons, new list. 50¹⁰
 Mahony's Troy Pol. Irons. 25¹⁰
 Mrs. Potts' Sad Irons, per set:
 No. 60. 55 60 65 60 65 65

Small lots. 75 70 80 80 85 88
 National Self-Heating. 50¹⁰
 New England. 56. 20¹⁰
 Scrap. 50¹⁰
 Scrap, Noiseless. 50¹⁰
 Scrap, Self-Heating. 50¹⁰
 Self-Heating Tailors. 40¹⁰
 Sensible, list Jan. 91. 50¹⁰
 Sensible Tailor's Irons. 33⁴⁵

Soldering—

Soldering Coppers. W. doz 21¹⁰
 Cover's Adjustable, list Jan. 1, 1894.
 35¹⁰
 Tinker's Dread. W. doz \$1.75; W. gro. \$1.18

Pinking—

Pinking Irons, W. doz, 55¹⁰

Jack Screws—

See Screws.

Jacks, Wagon—

Daisy. 33⁴⁵
 Lockport. 40¹⁰
 Victor. 33⁴⁵

Kettles—

Brass, Spun, Plain, list Jan. 1, '91. 25¹⁰

Brass, Spun, Pid. W. M. list Jan. 1, '91. 20¹⁰

Stamped Brass Kettles. 30¹⁰
 Enameled and Tea—See Ware, Hollow.

Knife Sharpeners—

See Sharpener, Knife.

Knives—

Butcher, Shoe, &c.

Ames' Bread Knives, W. doz \$1.50, 15¹⁰
 Ames' Butter Knives. 25¹⁰

Ames' Shoe Knives. 25¹⁰

Foster Bros' Butcher, &c. 40¹⁰

Jordan's AA At. Butchers', list. net

Moran's Shoe and Bread. 20¹⁰
 Nichols' Butcher Knives. 40¹⁰
 Wilson's Butcher Knives, list Dec. 3, 1890. 25¹⁰

Corn—

W. W. Wilson, Butcher, 6 in. \$2.00; 7¹⁰ in. \$3.80, &c.

Hay and Straw—See Hay Knives.

Table and Pocket—Net Prices.

Drawing—

April 26, 1894

Plate.....	\$34&2%
Romer's Night Latches.....	15¢
R. & K. Mfg. Co., list Mar. 20, 1889.....	60&10@70
Sargent & Co., Lis. Atg. 1.89. 60&10@70	
Warner's Burglar Proof. W. doz. \$8.00, 50¢	
Yale.....	net prices
Elevator—	33&1/2
Padlocks—	
Wrought Iron Padlocks:	
British, Graham & Mathes, list Jan. 1894.....	73¢
Mallory, Wheeler Co., list Jan. 1, 1894.....	75¢
Norwich Lock Mfg. Co., list June 10, 1891.....	50&2¢
Russell & Erwin Mfg. Co., list June 10, 1891.....	50&2¢
Sargent & Co., list January 1, 1894.....	75¢
William Wilcox Mfg. Co., list January 1, 1894.....	75&20¢
Ames Sword Co. up to No. 150.....	40¢
Ames Sword Co. above No. 150.....	50¢
Barnes Mfg. Co.	40@40&10¢
Champion Padlocks.....	40¢
A. E. Delt.....	40¢
Eagle.....	40¢
Eureka, Eagle Lock Co.	40&2¢
E. T. Frahm's Keystone Scandinavian, 1010 line.....	90&40¢
120 line.....	90&25¢
109 line.....	65¢
510 line.....	70&10¢
225, 610 and 200 lines.....	70¢
All other numbers.....	50&2¢
Horseshoe.....	W. doz. \$9. 50@50&10¢
Hothckiss.....	30¢
Nock's.....	30¢
Romer's Nos. 0 to 91.....	30¢
Romer's Scandinavian, &c., Nos. 100 to 505.....	15¢
Scandinavian.....	90&50¢
Slaymaker, Barry & Co.	
No. 10.10 line.....	90&50¢
No. 41 line.....	60¢
No. 61 line.....	60¢
No. 21 line.....	80¢
Star.....	60¢
Yale Lock Mfg. Co.'s.....	net prices
Sash, &c.—	
Attwell Mfg. Co.	25&33&1/2¢
Champion Safetylist January 1893. 70&5¢	
Clark's No. 1, \$10. No. 2, \$8 W. gr.	33&1/2¢
Common Sense, Jap'd, Cop'd, & Brzed.	W. gr. \$4.00
Common Sense, Nickel Plated, W. gr. \$10.00	
Corbin's Dalay, list Feb. 15, 1886.....	70¢
Davis Bronze, Barnes Mfg. Co.	60¢
Ferguson's.....	33&1/2¢
Fish (Liesche's pat.), No. 100, \$8 gr. \$8. No. 105, \$8 gr. \$10.	50¢
Giant, Hat Jan. 1892.....	70&25¢
Hammond's Window Springs.....	40¢
Hugunin's New Sash Locks.....	25&5&2/3¢
Hugunin's Sash Balances.....	25&5&2/3¢
Ives' Patent.....	60&10@60&10@10¢
Kempshall's Gravity.....	60¢
Kempshall's Model.....	60@60&10¢
Monarch.....	50¢
Payson's Perfect.....	60&10@60&10¢
Reading.....	60&10@60&10@10¢
Security.....	30¢
Universal.....	30¢
Victor.....	60&10@25¢
Walker's.....	10¢
Wolcott's.....	60&10@5¢
Lumber Tools—	
See Tools, Lumber.	
Lustro—	
Four-ounce bottles.....	W. doz. \$1.75; W. gross \$17.00
Machines.	
Boring—	
Without Augers, Upright, Angular.	
Boss, Carpenters' 3.60	
Boss, Ship Builders' 3.85	
Douglas.....	45.60 48.75
Jennings.....	5.60 6.75 .50@50&5¢
Millers Falls.....	7.50
Phillip's Patent—	
With Auger.... 7.00 7.50	
Snell's, Rice's Pat. 5.60 6.75. 40&10@10¢	
Fluting—	
American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....	35¢
Combined Fluter and Sad Iron.....	W. doz. \$15.00
Crown, 4½ in., \$3.50; 6 in., \$4.00; 8 in., \$6.50 each.....	30¢
Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25.	35¢
Crown Jewel, 6 in., \$3.50 each.....	30¢
Domestic Fluter.....	each, \$1.50
Eagle, 2½-inch Rolls, \$2.15.....	
Eagle, 5½-inch Rolls, \$2.85.....	35¢
Geneva Hand Fluter, White Metal, W. doz. \$12, 25¢	
Knox, 4½-inch Rolls.....	\$2.25 each; 35¢
Knox, 6-inch Rolls.....	\$3.60 each; 35¢
Shepard Hand Fluter, No. 35, per doz \$15.50.....	40¢
Shepard Hand Fluter, No. 95, W. doz. \$3.00.....	40¢
Shepard Hand Fluter, No. 110, W. doz. \$11.00.....	40¢
Holsting—	
Moore's Anti-Friction Differential Pulley Block.....	20¢
Moore's Hand Holst, with Lock Brake, 20¢	
Moore's Rope Differential Pulley Block.....	60¢
Mars & Beckley (Teal Patent).....	30¢
See also Blocks.	
Washing—	
Fair and Square.....	W. doz. \$42.00
Anthony Wayne, W. doz. No. 1, \$42; No. 2, \$38; No. 3, \$42.	
Wayne American.....	W. doz. \$36.00
Welsell.....	W. doz. \$54.00
Western Star W. doz. No. 2, \$36; No. 3, \$39	
Mallets—	
B. & L. Block Co., Hickory & L. V. 30&10@40¢	
Vibre Head, Stearns.....	33&1/2¢
Hickory.....	20&10@20@10@10¢
Lignumvitæ.....	20&10@20@10@10¢
Mattocks—Regular list.	
Measures—	60&10@60&10@5¢
Standard Fibreware, No. 1, peck 1 dozen. \$3.50; ½-peck, \$3.90	
Meat Cutters—	
See Cutters, Meat.	
Menders, Harness—	
Per doz.	\$2.00
Milk Cans—See Cans, Milk.	
Mills—	
Coffee—	
Box and Side, List Jan. 1, 1888. 60@60&5¢	
Net prices are often made which are lower than above discount.	
American, Enterprise Mfg. Co., list Jan. 17, 1893.....	30¢
National List, Jan. 1, 1894.....	30¢
Swift, Lane Bros.	30¢
Waddell's New Box Mills, Ideal Brand, New List.....	60¢
Mincing Knives—	
See Knives, Mincing.	
Molasses Gates—	
See Gates, Molasses.	
Money Drawers—	
See Drawers, Money.	
Mowers, Lawn—	
Highest 10 in. 12 in. 14 in. grade, \$4.00@5.25 \$4.50@6.00 \$5.00@6.75	
Good. \$3.00 \$3.25 \$3.50	
Cheap... 2.25 2.50 2.75	
Muzzles—	
Safety.....	W. doz. \$8.00, 25¢
Nails—	
Cut and Wire. See Trade Report.	
Wire Nails, Papered.	
Association List, May 1, 1902. 85&10@	
Hungarian, Finishing, Upholsterers, &c. See Tacks.	
Horse—	
Nos. 6 7 8 9 10	
A. C.	25¢ 23¢ 22¢ 21¢ 21¢
U. S.	25¢ 23¢ 22¢ 21¢ 21¢
American.....	9¢ 9¢ 9¢ 9¢ 9¢ 9¢ 10@10¢
Anchor.....	25¢ 21¢ 20¢ 19¢ 18¢
Ausable.....	28¢ 26¢ 25¢ 24¢ 23¢
Capewell.....	19¢ 18¢ 17¢ 16¢ 16¢ 10@25¢
C. B. K.	25¢ 23¢ 22¢ 21¢ 21¢
Champion.....	25¢ 23¢ 22¢ \$1 20¢
Champlain.....	28¢ 26¢ 25¢ 24¢ 23¢
Clinton, Firm. 19¢ 17¢ 16¢ 15¢ 14¢ 30¢@25¢	
Empire Bronzed.....	11@11¢@25¢
Essex.....	28¢ 26¢ 25¢ 24¢ 23¢
Lyra.....	9¢ 9¢ 9¢ 9¢ 9¢ 9¢
Maud S.	25¢ 23¢ 22¢ 21¢ 21¢
Northwest'n.....	25¢ 23¢ 22¢ 21¢ 20¢
Putnam.....	23¢ 21¢ 20¢ 19¢ 18¢
Snowden.....	9¢ 9¢ 9¢ 9¢ 9¢
Standard.....	23¢ 21¢ 20¢ 19¢ 18¢
Vulcan.....	23¢ 21¢ 20¢ 19¢ 18¢
Western.....	23¢ 21¢ 20¢ 19¢ 18¢
Picture—	
Brass Head, Combination list.....	50&10¢
Brass Head, Sargent's list.....	60@60@10¢
Porcelain Head, Combination list 40&10¢	
Porcelain Head, Sargent's list 50&10@10¢	
Niles' Patent.....	
Nail Pullers—See Pullers, Nail.	
Nail Sets—See Sets, Nail.	
Nut Crackers—	
See Crackers, Nut.	
Nuts—List Dec. 18, 1889.	
Square, Hex.	
Cold Punched.....	5.00¢ 6.10¢ off list
Hot Pressed.....	5.00¢ 6.50¢ off list
In packages of 100 lb, add 1-10¢ W. lb, net; in packages less than 100 lb, add ½ W. lb, net.	
Oakum—	
Best or Government.....	W. doz. 64@74¢
Navy.....	W. doz. 56@60¢
U. S. Navy.....	W. doz. 64@66¢
Oil Tanks—See Tanks, Oil.	
Oilers—	
Brass and Copper.....	50&10@50@10@25¢
Zinc and Tin.....	70@70@10¢
Broughton's Brass.....	50¢
Broughton's Zinc.....	60¢
Malleable, Hammers' Improved, No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40 W. doz. 10@10¢	
Malleable, Hammers' Old Pattern, same list.....	45¢
Oilstead's Brass and Copper.....	50¢
Oilstead's Zinc and Zinc.....	60¢
Prior's Fat or "Paragon" Brass.....	50¢
Prior's Fat or "Paragon" Zinc.....	60@10&10¢
Steel, Draper & Williams.....	50¢
Wilmett & Hobbs Mfg. Co., Steel Anti-Rust.....	60¢
Brass.....	70¢
Iron, list Nov. 11, 1885.....	75¢
Pipe, Wrought Iron—	
List April 13, 1893.	
14 and under, Plain.....	57@62@10@10@10¢
14 and over, Galv.....	57@62@10@10@10¢
15 and over, Plain.....	57@62@10@10@10¢
Boiler Tubes, list Oct. 24, 1890.....	55@60@10@10@10¢
Casing, list Nov. 16, 1892. 52@54@10@10@10¢	
Drawn, list Nov. 16, 1892. 52@54@10@10@10¢	
Inserts, Joints Casing, list Nov. 16, 1892.....	47@51@10@10@10¢
Steel Boiler Tubes.....	27@31@10@10@10¢
Planes and Plane Irons—	
Wood Planes—	
Molding.....	40@10@50¢
Bench, First quality.....	45@50@55¢
Bench, Second quality.....	50@55@60¢
French, No. 4.....	W. gr. \$2.25, 55@60¢
French, No. 5.....	W. gr. \$3.00, 65@70¢
Sprague, No. 1, \$5¢; 2, 60¢; 3, 55¢; 4, 50¢	
Star.....	W. doz. \$2.75
Universal, W. doz. \$3.00.....	55@60¢
World's Best, W. gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....	50@55@60¢
Miscellaneous—	
American Packing.....	9¢ 10¢ W. doz.
Cotton Packing.....	14@15¢ W. doz.
Italian Packing.....	12@13@14 W. doz.
Jute.....	6¢ 7¢ 8¢ W. doz.
Russia Packing.....	13¢ 14¢ W. doz.
Packing, Steam—	
Rubber—	
Standard, fair quality.....	70@10@75¢
Inferior quality.....	75@10@80¢
Extra.....	60&10@60@10@80¢
Jenkins' Standard, W. doz. 25¢ 25¢ 25¢	
N. Y. E. & P. Co., Double Diamond.....	60¢
N. Y. E. & P. Co., Sammander.....	45¢
N. Y. E. & P. Co., Carbon.....	70¢ 75¢
Potato—	
Creamery—	
S. S. & Co., 18-qt., \$7.00; 20-qt., \$7.25 W. doz.	
Galvanized Pails—	
Light. Heavy.	
10 Quart.....	\$2.00@2.25
12 Quart.....	2.25@ 2.50
14 Quart.....	2.50@ 2.75
Galvanized Buckets—	
Fire. Well.	
10 Quart.....	\$2.50@3.75
12 Quart.....	2.75@ 3.00
14 Quart.....	3.00@ 3.25
Indurated Fiber Ware—	
Fire Pails, deep.....	W. doz. \$1.50
Fire Pails, round bottom.....	W. doz. \$1.50
Milk, 14 qt.....	W. doz. \$1.50
Stable, 14 qt.....	W. doz. \$1.00
Star Pails, 12 qt.....	W. doz. \$1.20
Standard Fiber Ware—	
Plain. Plain. Doord'	
Buggy Pails.....	\$3.00
Chamberlain, 14 qt.....	6.00
Dairy Pails, 14 qt.	3.75
Fire Pails, No. 1, 12 qt.	4.25
Fire Pails, No. 2, 14 qt.	4.25
Horse Pails.....	4.00
Star Pails, 12 qt.....	5.50
Water Pails, 12 qt.	3.75
Pans—	
Standard Fiber Ware—	
Plain. Plain. Doord'	
Buggie Pails.....	\$3.00
Chamberlain, 14 qt.....	6.00
Dairy Pails, 14 qt.	3.75
Fire Pails, No. 1, 12 qt.	4.25
Fire Pails, No. 2, 14 qt.	4.25
Horse Pails.....	4.00
Star Pails, 12 qt.....	5.50
Water Pails, 12 qt.	3.75
Pans—	
Dripping—	
Large sizes.....	W. doz. 5¢ 5¢
Small sizes.....	W. doz. 5¢ 5¢
Silver & Co. (Covered).	40¢
Fry—	
Standard List:	
No.	1 2 3 4
W. doz. \$3.00	83.75 64.25 47.75 36.25
No.	5 6 7 8
W. doz.	66.00 57.00 48.00 39.00
Published, regular goods.....	76@75@10@10¢
Acme Fry Pans.....	66¢@6¢
Dust—	
Steel Edge, No. 1.....	W. doz. \$1.75
Roasting and Baking—	
Columbian, S. S. & Co.: Nos. 10, \$2; 20, \$2.50; 30, \$2.50 each.....	60@10@10@10¢
Panzer & Co. (Fried Eggs).	70@10@70@10@10¢
Sibley's Emery and Crocus Cloth.....	30¢@30¢
Parers—	
Apple—	
Advance.....	W. doz. \$4.75
Baldwin.....	W. doz. 5¢
Bonanza.....	each 5.00
Daisy.....	W. doz. 4.00
Dandy.....	each 7.50
Eclipse.....	W. doz. 4.00
Eureka, 1888.....	each 16.00
Family Bay State.....	each 12.00
Favorite.....	W. doz. 5.00
Gold Medal.....	W. doz. 4.00
Ideal.....	W. doz. 4.00
Improved Bay State.....	W. doz. 27.00@80.00
Little Star.....	W. doz. 4.50
Monarch.....	W. doz. 13.50
New Lightning.....	W. doz. 5.50
Oriole.....	W. doz. 4.00
Penn.....	W. doz. 3.00
Perfection.....	W. doz. 4.00
Pomona.....	W. doz. 4.00
Reading 72.....	W. doz. 4.00
Reading 78.....	W. doz. 7.00
Rocking Table.....	W. doz. 6.00
Turn Table.....	W. doz. 4.50
Victor.....	W. doz. 13.50
Waverly.....	W. doz. 4.00
White Mountain.....	W. doz. 4.00
Potato—	
Antrim Combination.....	W. doz. \$5.50
Hoosier.....	W. doz. \$18.50
Saratoga.....	W. doz. \$5.50
White Mountain.....	W. doz. \$4.50
Pencils, Soapstone—	
See Crayons.	
Pickers, Fruit—	
Prize Fruit Pickers.....	60¢
Picks—	
Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$18.00.....	60@10@10@70¢
Paste—	
Black Flag.....	W. gro. \$7.00
Black Flag, 5 and 10 lb. pails.....	W. gro. 5¢ 12¢
Black Flag, liquid, in bottles, W. gro.	60¢
Black Jack Water Paste, 5 and 10 lb. cans.....	W. gro. 12¢
Bonnell's Liquid Stove Polish, W. gro. \$6.00	10¢
Bonnell's Paste Stove Polish, W. gro. \$6.00	10¢
Boynton's Noon Day.....	W. gro. \$1.00
Crown Paste.....	W. gro. \$7.20
Crown Paste in 5 and 10 lb. pails, W. doz. 12¢	12¢
Diamond O. K. Enamel, W. gro. \$10.00	10¢
Diamond Rock Nickel Cleaner.....	W. gro. \$10.00
Joseph Dixon's.....	W. gro. \$6.00, 10¢
Dixon's Plumbeago.....	W. gro. 8¢
Freiside.....	W. gro. \$2.00
Gem.....	W. gro. \$1.50, 10¢
Gold Medal.....	W. gro. \$6.00, 25¢
Japanese.....	W. gro. \$3.50
Lustro.....	W. gro. \$4.75
Nickel Plate Paste.....	W. gro. \$6.00
Parlon Pride Stove Enamel, W. gro.	10¢
Raven Liquid, 6 oz. bottles.....	W. gro. \$8.00
Raven Paste in 5 lb. pails (cases of 6).....	W. gro. \$9.00
Raven Water Polish, large boxes.....	W. gro. 10¢
Rising Sun, 5 gro. lots.....	W. gro. \$5.50
Ruby.....	W. gro. \$7.20
Yates' Liquid, 2 3 5 10 gal.	W. gro. \$3.75
Yates' Standard Paste Paint, 10 lb. cans, W. doz. 12¢; 1 lb. cans, W. doz. 10¢	10¢
Poppers, Corn—	
Round or Square.	
1 qt.	W. doz. \$1.00; W. gr. \$8.00
1 ½ qt.	W. doz. \$1.00; W. gr. \$9.00

April 26, 1894

Snaps, Harness, &c.—

Anchor, 1 st , 2 ^d , mrg. Co.,	... 65
Andrews' Saddle, 50%	... 50
Covett's Saddlery Works' Triumph	... 50
Covered Spring	... 60&10&10% Covert
Covert	... 50&10&5&5%
Covert, New Patent	... 50&10&5&5%
Covert, New R. E.	... 60&10&5&5%
Fitch's (Bristol)	... 10%
German, new list	... 40&10%
Hotchkiss	... 10%
Kelley & Woolworth's Steel Harness	... 10%
John Prots Snaps	... 50&10@60%
Sargent's Patent Guarded	... 70&10&10%

Snaths—

Scythe 50&2@50&10%

Soldering Irons—

See Irons, Soldering.

Splitters Cupidors, &c.—Standard Fiberware—
Cupidors, 8¹/₂ inch, 1^d doz., No. 5, \$8; No. 5X, \$9.Splitters, Daisy, 8-inch, No. 1, 1^d 10 and
11 inch, \$8.**Spoke Shaves—**

See Shaves, Spoke.

Spoke Trimmers—

See Trimmers, Spoke.

Spoons and Forks—

Tinned Iron—

Basting, Cen. Stamp. Co.'s list, ... 70&25%

Buffalo, S. S. & Co., ... 89&4&23%

Solid Table and Tea, Cen. Stamp. Co.'s
list, ... 70&25%**Silver Plated—**

4 months or 5 cash 30 days:

L. Boardman & Son, ... 50&12&5%

Holmes & Edwards Silver Co., ... 40, 15&5%

Meriden Brit. Co., Rogers, ... 40&15%

Reed & Barton, ... 40&40&5%

Rogers & Bros., ... 40&15%

C. Rogers & Bros., ... 40&15%

Rogers & Hamilton, ... 40&15%

Wm. Rogers Mfg. Co., ... 40, 15&5%

Simpson, Hall, Miller & Co., ... 40, 15&5%

Miscellaneous—Boardman's Britannia Spoons, case
tots, ... 60&55 cashBoardman's Nickel Silver, list July 1,
1891, ... 60&57 cash

Britannia, ... 60&50&5%

German Silver, ... 50&10&5%

Nickel Silver, ... 50&2@5&10&5 cash

Holmes Edward Silver Co., ...

No. 22 German Silver, ... 50&10&5%

No. 30 Silver Metal, ... 50&10&5%

No. 49 Nickel Silver, ... 50&10&5%

No. 50 Nickel Silver, ... 50&10&5%

No. 67 Mexican Silver, ... 50&10&5%

Rogers & Hamilton, ...

Olmstar Flatware, ... 40&15&5%

Cinestar Steel Goods, ... 40&10%

Crown Hamilton, Flatware and Cut-
lery, ... 50%

Steel Goods, ... 40&10%

Wm. Rogers Mfg. Co., ... 22&5

22% Rogers' German Silver, ... 60&5%

22% Rogers' Nickel Silver, ... 60&5%

Rogers' Silver Metal, ... 50&10&5%

Springs—Door—

Champion (Coll.) ... 60&10@60&10&10%

Crown's, No. 1, 1^d doz. \$18.00; No. 2,
\$15.00; No. 3, ... 50@50&10%

Crown (Coll.), list April 19, 1888, ... 20%

Hercules, ... 50@50&10%

Phoenix, ... 35&5

Rubber complete, 1^d doz. \$4.50, ... 55&10%

Star (Coll.), list April 19, 1888, ... 20&10%

Torrey's Rod, 39 in., ... 1^d doz. \$1.20@1.25Warner's No. 1, 1^d doz. \$1.50; No. 2,
\$3.40; No. 3, ... 55@55&10%

Victor (Coll.), ... 60&10@60&10&10

Carriage, Wagon, &c.—

Elliptic, Concord, Platform and Half
Screws, ... 60@10@60&10&10 or net prices

Clift's Bolster Springs, ... 25%

Sprinklers, Lawns—Gibbs' Arc, ... 1^d doz., \$12.00Gibbs' Hustler, ... 1^d doz., \$8.00**Squares—**

Nickel-Plated, ... 80&10&10@85&5%

Steel and iron, ... 80&10&10@85&5%

Try Square and T Bevels, ... 60&10&10%

Avery's Bevel Protractor, ... 40&10%

Avery's Flush Bevel Squares, ... 40&10%

Blaston's Try Square and T Bevels, ... 50%

Starrett's micrometer Caliper Squares,

Winterbottom's Try and Miter, ... 30&10%

Squeezers—Fodder, ... 1^d doz. \$2.00Blair's "Olimax", ... 1^d doz. \$1.25**Lemon—**Porcelain Lined, No. 1, 1^d doz. \$6.00Wood, Common, ... 1^d doz. \$1.70@1.75Wood, No. 2, ... 1^d doz. \$8.00, 35%Dean's, No. 1, 1^d doz. \$6.50; No. 2, \$8.35;

Queens, No. 1, ... 1.90; Queens, \$2.50

Dunlap's Improved, ... 1^d doz. \$7.75, 20%Hotchkiss Straight Flash, ... 1^d doz. \$12.00Jennings' Star, ... 1^d doz. \$2.50

King, ... 40&5%

Little Giant, ... 50@50&5%

Sammis' No. 1, \$5.00; No. 2, \$9.12;

\$18 1^d doz. ... 25&10%The Boss, ... 1^d doz. \$2.50**Standard Fiber Ware—**

See Ware, Standard Fiber.

Staples—Barbed Blnd, 1/4 in. and larger, 1^d doz. 72@74%Barbed Blnd, 1/4 in., ... 1^d doz. 82@84%

Fence Staples, Galvanized, ... Same price

Fence Staples, Plain, ... See Trd Rep.

Grand Crossing Tack Co.'s list, ... 75&10%

Steels Butchers'—

C. & A. Hoffmann's, ... 40%

Nichols Bros., ... 40&10%

Steelyards 40&10@60%**Stocks and Dies—**

Blacksmith's, ... 35%

Butterfield's Goods, ... 35%

Waterford Goods, ... 35%

Gardiner, ... 35%

Green River, ... 35%

Lightning Screw Plate, ... 35@30%

Keoge's New Screw Plates, ... 35@30%

Reversible Ratchet, ... 30%

Stone—

Stones, Grind—See Grindstones.

Scythe Stones—

Pike Mfg. Co., list April, 1892, ... 38@45%

Cleveland Stone Co., list Nov 1892, 38@45%

Oil Stones, &c.—

Pike Mfg. Co.,	
Hindman No. 1, 1 ^d doz. ... 84	
Sand Stone, ...	
Turkey Oil Stone, 4 to 8 in., ... 40 @ 40%	10%
Turkey Slips, ... 32.00	

Lily White Washita, ... 604	
Rosy Red Washita, ... 604	
Washita Stone, Extra, ... 604	
Washita Stone, No. 1, ... 604	
Washita Stone, No. 2, ... 604	
Lily White Slips, ... 904	
Rosy Red Slips, ... 904	
Washita Slips, Extra, ... 904	
Washita Slips, No. 1, ... 904	
Arkansas Stone, 1 ^d to 8 in., ... 58@50	
Arkansas Stone, No. 1 1/2 to 8 in., ... 58@50	
Lake Superior, ... 7 D 134	
Lake Superior Slips, ... 7 D 804	
Tanite Mills:	
Emery Oil, ... 1 ^d doz., \$0.00. 50@65%	

Stops, Bench—

Cincinnati, ... 25@10%

Crescent, ... 1^d doz. \$1.50Hotchkiss', ... 1^d doz. \$5.00 @ 10&10%

McGills' \$ doz \$3

Millers Falls, ... 25@10%

Morrill's, 1^d doz. \$1.00; No. 2, \$1.00

40@20&10%

Stearns', ... 20@10%

Terrell's Nos. 1 and 2, 1^d doz.; No. 3, \$3.60

Weston's, No. 1, \$1.00, No. 2, \$9.25@10&5%

Stove Polish—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Straps, Razor—Badger's Belt and Com., ... 1^d doz. \$2.00

Campbell Cutlery Co., ... Net prices

Electric Cutlery Co., ... Net prices

Genuine Emerson, ... 60@60&25%

Imitation, ... 1^d doz. \$2.00, 20@10&5%

Jordan's Pat. Padded, list Nov. 1, '89, 50%

Lamont Combination, ... 1^d doz. \$4.00

Torrey's, ... Net prices

Stove Polish—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Strops, Razor—Badger's Belt and Com., ... 1^d doz. \$2.00

Campbell Cutlery Co., ... Net prices

Electric Cutlery Co., ... Net prices

Genuine Emerson, ... 60@60&25%

Imitation, ... 1^d doz. \$2.00, 20@10&5%

Jordan's Pat. Padded, list Nov. 1, '89, 50%

Lamont Combination, ... 1^d doz. \$4.00

Torrey's, ... Net prices

Stretcher's Carpet—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Stubs, Razor—Badger's Belt and Com., ... 1^d doz. \$2.00

Campbell Cutlery Co., ... Net prices

Electric Cutlery Co., ... Net prices

Genuine Emerson, ... 60@60&25%

Imitation, ... 1^d doz. \$2.00, 20@10&5%

Jordan's Pat. Padded, list Nov. 1, '89, 50%

Lamont Combination, ... 1^d doz. \$4.00

Torrey's, ... Net prices

Stumpers, Carpet—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Stopper's, Carpet—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Stopper's, Carpet—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Stopper's, Carpet—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Stopper's, Carpet—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Stopper's, Carpet—

Cast Iron, Steel Potaz, ... 7 D 75@80

Cast Iron, Polished, ... 7 D 2.25

Socket, ... 7 D 1.75

Bullard's, ... 25@25&10%

Whips

American Whip Co.: Length.	4 ft	5	5½	6	6½	7	7½	8 ft.
X. L. Whalebone Driving.	\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Eureka, Two-thirds Whalebone.	....	15.00	16.50	18.00	20.00	....	....	....
Bull Bone, Half-length Whale bone.	....	....	....	....	....	....	....	....
American Standard.	8.00	8.50	9.50	10.50	12.00	12.50	15.00	16.50
True Grip, Raw Hide Center.	6.00	6.00	6.50	7.00	7.50	8.00	....	....
New Name, Stocked Java, Black and Wine Colors.	....	....	6.00	....	....	....	....	....
American, 92 Pen Whip.	....	....	6.00	....	....	....	....	....
Gents' Light Driving No. 111.	....	....	6.00	....	....	....	....	....
Gents' Light Driving No. 106.	....	....	5.00	....	....	....	....	....
Hand-made Stocked Java No. 108.	....	....	8.75	4.00	....	....	....	....
A large variety of cheaper grades.	....	....	....	....	....	60¢@8.00	....	....
Team Whips.	....	....	....	....	....	82.00@37.50	....	....
Toy Whips.	....	....	....	....	....	....	....	....
Hardware Assortment, 10/American, 75 Whips for \$50.00.	....	....	....	....	....	....	....	....

Per dozen.	Steel Music Wire, 12 to 30, imported.	60¢@70¢	2 lb.
Stubs' Steel Wire.	....	8.00 to 2.80	....
Tate's Spooled, Tin'd & Annealed.	....	60¢@5%	....
Tate's Spooled Cop. and Brass.	....	50¢@5%	....
Tinned Broom Wire, 12 to 21.	....	50¢	14¢
Wire Clothes Line, see Lines.	....	....	....
Wire Picture Cord, see Cord.	....	....	....
Bright Wire Goods—	....	....	....
Standard list.	....	90¢@90&15%	....
Wire Cloth and Netting—	....	....	....
Galvanized Wire Netting.	....	80¢@80&10&5%	....
Painted Screen Cloth, 100 ft \$1.40@\$1.45	....	....	....
Wire Barb—	....	....	....
See Trade Report.	....	....	....
Wire Rope—See Rope, Wire.	....	....	....
Wrenches—	....	....	....
American Adjustable.	....	40¢	....
Baxter's Adjustable "S".	....	40¢@10@5%	....
Baxter's Diagonal.	....	60¢	....
Coos' Genuine.	....	50¢@50@10%	....
Coos' "Mechanics".	....	50¢@10@25%	....
Girard Standard.	....	65@10@70%	....
Lamson & Sessions' Engineers.	....	60@10%	....
Lamson & Sessions' Standard.	....	70@10%	....
Lamson & Sessions' Agricultural.	....	75¢@10@5@	....
P. S. & W. Agricultural.	....	80@5%	....
W. & B. Diamond.	....	....	....
Acme, Bright.	....	50¢@25	....
Acme, Nickled.	....	40¢@31	....
Wringers, Clothes—	....	....	....
Am. Wringer Co.'s list, July, '88.	25¢	cash	....
Colby Wringer Co., list Sept. 1.	81¢	25¢ cash	....
Lovell Mfg. Co., list July 1, 1882.	25¢	cash	....
Peerless Mfg. Co., list Feb., 1882.	25¢	cash	....
National Wringer & Mfg. Co., list June 1, 1882.	....	25¢	cash
Wrought Goods—	....	....	....
Staples, Hooks, &c., list, March 17, 1890.	85¢@10@5@15%	....	....

Wire and Wire Goods—**Iron—**

Market,	....	....	....
Br. & Ann., Nos. 0 to 18.	....	....	....
75¢@10@25@10@5%	....	....	....
Cop'd., Nos. 0 to 18.	75¢@10@25@10@5%	....	....
Galv., Nos. 0 to 18.	70¢@10@25@10@5%	....	....
Tin'd., Tin'd. list, Nos. 0 to 18.	70¢@10@25@10@5%	....	....

stone,	....	....	....
Ba. and Ann'd.,	....	....	....
Nos. 16 to 18.	80¢	Extra 10%	....
Nos. 19 to 24.	80¢@5%	....	....
Nos. 27 to 33.	82½@5%	often given.	....
Annealed Wire on Spools.	....	60¢	....
Bra. list Jan. 18, 1884.	....	40¢@5%	....
Cast Steel Wire.	....	50¢	....
Cooper, list Jan. 18, 1884.	....	40¢@5%	....
Galvanized Fence.	....	75¢@10@5%	....
Malin's An'tled & Tin'd on Spools.	....	60¢@5%	....
Malin's Brass and Cop. on Spools.	....	50¢@5%	....

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable Oils—

Linseed, City, raw., per gal.	52	6	..
Linseed, City, boiled.	55	6	..
Linseed, Western, raw.	50	6	..
Lard, City, Extra Winter.	64	6	..
Lard, City, Prime.	63	6	..
Lard, City, Extra No. 1.	50	45	..
Lard, City, No. 1.	63	45	..
Lard, Western, prime.	63	28	..
Cotton-seed, Crude, prime.	27	6	28
Cotton-seed, Crude, oil	25	6	28
Cotton-seed, Summer Yellow, prime.	32	6	33
Cotton-seed, Summer Yellow, oil, on grades.	31	6	63
Sperm, Crude.	68	65	..
Sperm, Natural Spring.	68	65	..
Sperm, Bleached Spring.	68	70	..
Sperm, Natural Winter.	73	65	75
Whale, Crude.	44	..	..
Whale, Natural Winter.	47	..	..
Whale, Bleached Winter.	47	..	..
Whale, Extra Bleached.	49	..	..
See Elephant, Bleached Winter.	....	....	....
Menhaden, Crude, Sound.	26	66	..
Menhaden, Crude, Southern.	34	66	35
Menhaden, Light Pressed.	34	66	35
Menhaden, Bleached W'ter.	38	66	39
Menhaden, Extra Bleached.	40	41	..
Tallow, City, prime.	45	6	17
Tallow, Western, prime...	43	6	15
Cocoanut, Ceylon.	54¢@	54	..
Cocoanut, Cochin.	64¢@	64	..
Cod, Domestic.	38	40	..
Cod, Foreign.	40	43	..
Red Elaine.	35	33	..
Red Saponified.	44¢@	43	..
Bank.	....	35	..
Straits.	....	38	..
Olive, Italian, bibs.	58	62	..
Neatsfoot, prime.	60	65	..
Palm, prime, Lagos.	54¢@	54	..

Mineral Oils—

Black, 29 gravity, 25 @ 30 cold test.	7	6	7½
Black, 29 gravity, 16 cold test.	7	6	8
Black, 29 gravity, summer.	54¢@	6%	..

Lead, Red, bbls. and ½ bbls.	54	6	5½
Lead, Red, kegs.	54	6	13
Litharge, kegs.	54	6	5½
Litharge, bbls. and ½ bbls.	54	6	5½
Ocher, Rochelle.	138	6	1½
Ocher, French Washed.	138	6	3
Ocher, German Washed.	138	6	3
Zinc, V. M. in Poppy Oil, G. Seal.	8½@	9	..
Zinc, French, V. M. X.	6	6	..
Zinc, Antwerp, Red Seal.	6	6	6½
Zinc, Antwerp, Green Seal.	6½@	7½	..
Zinc, German, L. Z. O.	5	6	5½
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over.	10½@	..	..
lot less than one ton.	11	6	..
Zinc, V. M. in Poppy Oil, Red Seal.	10	6	10
lot of 1 ton and over.	10½@	..	..
lot of less than 1 ton.	10½@	..	..
DISCOUNTS.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1½; 25 bbls., 2 ½; 50 bbls. 4%; discount allowed on less than bbl. lots.	....	....	....

Colors in Oil—

Black, Drop, Frankfort.	25	6	30
Black, Drop, English.	12	6	15
Black, Drop, Domestic.	7	6	10
Black, Lampblack, Best.	20	6	35
Black, Lampblack, Common	7	6	13
Black, Ivory.	8	6	15
Blue, Chinese.	35	6	40
Blue, Prussian.	20	6	45
Blue, Ultramarine.	12	6	18
Brown, Vandyke.	7	6	12
Green, Chrome.	8	6	13
Green, Paris.	16	6	18½
Sienna, Raw.	7	6	14
Sienna, Burnt.	7	6	10
Umber, Raw.	7	6	10
Umber, Burnt.	7	6	10
Umber, Turkey, Raw and Powdered.	2½@	3½	..
Umber, Turkey, R'w Lumps.	2½@	2½	..
Umber, Turkey, Bnt. Amer.	13½@	12	..
Umber, Turkey, R'w Amer.	13½@	12	..
Yellow, Chrome.	10	6	25
Vermilion, American Lead.	11	6	12
Vermilion, Quicks'r, bulk.	43	6	..
Vermilion, Quicks'r, bags.	44	6	..
Vermilion, Quicks'r, sm' r pkgs.	52	6	60
Vermilion, English Import.	8	6	30
Vermilion, English Eng.	60	6	95
Vermilion, Trieste.	85	6	100
Vermilion, Chinese.	85	6	100
Whiting Common.	50	6	55
Whiting Gilders.	50	6	55
Zinc, American, dry.	3½@	4½	..
Zinc, French, Red Seal.	7	6	7½

Putty—

In barrels and ½ bbls.	....	....	....
In tubs.	....	....	....
In tin cans.	....	....	....
In bladders.	....	....	....

Spirits Turpentine—

In regular bbls.	....	....	....
In machine bbls.	....	....	....

Glue—

Low Grade.	....	....	....
Cabinet.	11	6	14
Median White.	12	6	14
Extra White.	13	6	20
French.	10	6	22
English.	10	6	18
Irish.	10	6	12½

RATES OF SUBSCRIPTION : INCLUDING POSTAGE.**UNITED STATES AND BRITISH AMERICA.**

Weekly Edition, Issued every THURSDAY morning. \$4.50 a year.

Semi-Monthly Edition, FIRST and THIRD THURSDAYS of every month. \$3.30 " "

Monthly Edition, FIRST THURSDAY of every month. \$1.15 "

RATES OF ADVERTISING :

ONE INSERTION

ONE MONTH

THREE MONTHS

New York (Main Office),

Philadelphia,

Pittsburgh,

Chicago,

Cincinnati,

St. Louis,

Boston,

Cleveland,

BRITISH AGENCY : Office of The Ironmonger, 42 Cannon St., London.

CURRENT METAL PRICES.

APRIL 25, 1894.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

**IRON AND STEEL—
Bar Iron from Store**

Common Iron:	
2 to 2 in. round and square..	1.80 @ 1.70
1 to 6 in. x 3/8 to 1 in.....	
2 to 2 in. round and square.	1.70 @ 1.90
1 to 4 in. x 3/8 to 1 1/2 in.....	
4 to 6 in. x 3/8 to 1 in.....	1.90 @ 2.00
1 to 6 in. x 1/4 and 5/16.....	1.80 @ 1.90
Rods—3/8 and 11/16 round and sq. #	1.80 @ 1.90
Bands—1 to 6 x 3/8 to No. 12.....	2.00 @ 2.10
"Burden Best" Iron, base price, #	2.80
Burden's "H. B. & S." Iron, base price.....	2.60
"Ulster".....	2.80
Norway Bars.....	3.50 @ 3.75
Norway Shapes.....	4.00 @ 4.50

Merchant Steel from Store

	Per lb
Open-Hearth and Bessemer Machinery, Tire Calk, Tire and Sleigh Shoe, base price in small lots.....	2
Best Cast Steel, base price in small lots.....	7 1/2
Best Cast Steel Machinery, base price in small lots.....	4 1/2

Sheet Iron from Store
Black—

Best Refined Iron.	
Nos. 14 to 20.....	2.90
21 to 24.....	3.00
25 to 26.....	3.10
27.....	3.20
28.....	3.40

Common 3/4 less than the above.

Open Hearth Steel.

Best Soft Steel, Nos. 14 to 18.....	2 1/2 @ 2 3/4
" " " 18 to 20.....	2 1/2 @ 3
" " " 21 to 24.....	3 1/2 @ 3 1/4
" " " 25 to 26.....	3 1/2 @ 3 1/4
" " " 27 to 28.....	3 1/2 @ 3 1/4

Best Bloom Sheets, 1/4 extra over above prices.
Best Bloom, Galvanized, Jobbing dis. 70 @ 70 & 1/2
Ordinary Bessemer, 3/4 @ 1/4 lower than
above prices.
Russia, Planished, &c.

Genuine Russia, according to assortment.....	11 1/4 @ 12
Patent Planished.....	10 @ 10
Craig Polished Sheet Steel.....	8 @ 8

Foreign Steel from Store

Best Cast.....	15 @ 15
Extra Cast.....	16 @ 17
Swaged, Cast.....	16
Best Double Shear.....	15
Blister, 1st quality.....	12
German Steel, Best, 2d quality.....	10
3d quality.....	9
Sheet Cast Steel, 1st quality.....	15
2d quality.....	14
3d quality.....	12
R. Mushet's "Special", Annealed.....	48
" " " Titnico".....	20
Hicken's Special No. 8.....	30
" Extra.....	15

**METALS—
Tin—**

	Per lb
Ranca, Pigs.....	21 1/2 @ 21
Straits, Pigs.....	20 1/2 @ 21
Straits in Bars.....	22 @ 22 1/2

Tin Plates—

Duty: 2 1/2 @ 1.		
Charcoal Plates—Bright— Guaranteed Plates command special prices, according to quality.	Per box	
Melvyn and Calland Grade, IC, 10 x 14.....	6.50	
" " " " 12.....	6.75	
" " " " 14.....	6.60	
" " " " 20.....	12.00	
" " " " 28.....	8.50	
" " " " 32.....	8.75	
" " " " 40.....	8.50	
" " " " 48.....	8.50	
" " " " 56.....	8.50	
" " " " 64.....	8.50	
" " " " 72.....	8.00	
Allaway Grade.....	10 x 14.....	6.00
" " " " 12.....	6.25	
" " " " 14.....	6.00	
" " " " 20.....	12.00	
" " " " 28.....	7.25	
" " " " 32.....	7.50	
" " " " 40.....	7.25	
" " " " 48.....	14.50	
" " " " 56.....	5.50	
" " " " 64.....	6.75	

Coke Plates—Bright—

col Coke.—IC, 10 x 14, 14 x 20.....	5.40 @ 5.50
10 x 20.....	8.25
20 x 28.....	11.50
IX, 10 x 14, 14 x 20.....	6.75
BV Grade—IC, 10 x 14, 14 x 20.....	5.50

Charcoal Plates—Terne—

Guaranteed Plates command special prices according to quality.	
Dean Grade.—IC, 14 x 20.....	5.65
20 x 28.....	11.00
IX, 14 x 20.....	6.40
20 x 28.....	12.80

Abecarne Grade.—IC, 14 x 20.....	5.50
20 x 28.....	10.75
IX, 14 x 20.....	6.40
20 x 28.....	12.80

Tin Boiler Plates—

XXX, 14 x 26.....	12 sheets.....	12.25
XXX, 14 x 28.....	12 sheets.....	14.50
XXX, 14 x 31.....	12 sheets.....	16.00

American Terne Plates.—Apollo.	
IC, 14 x 20.....	6.25
IC, 20 x 28.....	12.50
IX, 14 x 20.....	7.25
IX, 20 x 28.....	14.00

Copper—

DUTY: Pig, Bar and Ingot, 1 1/4@; Old Copper, 1@ D. Manufactured (including all articles of which Copper is a component of chief value), 35% ad valorem.

Ingot—

Lake..... @ 11
Ansonia grade Arizona..... @ 10
Ansonia grade Casting..... @ 10

Sheet and Bolt—

Prices adopted by the Association of Copper Manufacturers of the United States, March 22, 1894. Stubs' gauge standard.

Net—

* Special price not less than 80 cents.
Discount from List 40%.

Common High Brass:	in.	in.	in.	in.	in.	in.	in.
Wider than and including	24	26	28	30	32	34	36
	26	28	30	32	34	36	38
To No. 20, inclusive.	.89	.42	.46	.50	.55	.60	.64
Nos. 21, 22, 23 and 24.	.89	.43	.47	.51	.56	.61	.65
Nos. 25 and 26.	.89	.44	.48	.53	.58	.63	.67
Nos. 27 and 28.	.89	.45	.49	.53	.58	.63	.67

* Special price not less than 80 cents.

Discount from List 40%.

Wire in Coils.

List April 9, 1894.

Brown & Sharpe's Gauge the Standard.	om. high brass.	Low brass.	Gilding Bronze and Copper
All Nos. to No. 10 inclusive.	\$0.23	\$0.17	\$0.31
Above No. 10 to No. 15.....	28 1/2	27 1/2	1 1/2
No. 17 and No. 18.....	.26	.28	.32
No. 19 and No. 20.....	.26	.29	.33
No. 21.....	.26	.30	.34
No. 22.....	.27	.31	.35
No. 23.....	.28	.32	.36
No. 24.....	.30	.34	.38
No. 25.....	.32	.36	.40
No. 26.....	.35	.39	.43
No. 27.....	.38	.42	.46
No. 28.....	.42	.46	.51
No. 29.....	.45	.49	.54
No. 30.....	.48	.52	.58
No. 31.....	.51	.55	.62
No. 32.....	.55	.59	.73
No. 33.....	.59	.63	.62
No. 34.....	.64	.68	.61
No. 35.....	.70	.74	.79
No. 36.....	.78	.80	.80
No. 37.....	1.00	1.14	.70
No. 38.....	1.30	1.34	.70
No. 39.....	2.00	2.00	3.25
No. 40.....	2.60	2.60	6.75

Discount, 40%.

Spring Wire, 2¢ per lb advance.

Copper Belt and Hose Rivets and Burrs—

Per lb.

No. 5..... .49

No. 6..... .49

No. 7..... .49

No. 8..... .50

No. 9..... .52

No. 10..... .54

60% @ 5% discount.

Tobin Bronze—Rods.

Drawn Rods for Bolts, Forgings, &c.

14 to 34 inches inclusive..... 17¢ per lb

Over 34 to 5 inches inclusive..... 18¢ per lb

Piston Rods, Finished True, Smooth and Straight.

14 to 34 inches inclusive..... 18¢ per lb

Over 34 to 5 inches inclusive..... 19¢ per lb

Spelter—

Duty: Pig, Bars and Plates, \$1.50 per 100 lb.

Western Spelter..... 41¢

Bertha (pure)..... 8¢ @ 8¢

Zinc—

Duty: Sheet, 2¢ per lb.

800 lb casks..... 43¢

Per lb..... 54¢

Lead—

Duty: Pig, \$2 per 100 lb. Old Lead, 2¢ per lb. Pipe and Sheets, 2 1/2¢ per lb.

American Pig..... 3 1/2¢ @ 4¢

Bar..... 4¢

Pipe, subject to discount 20%..... 5¢

Tin-Lined Pipe, subject to discount 20%..... 15¢

Block Tin Pipe, subject to discount 20%..... 37¢

Sheet, subject to discount 20%..... 63¢

Old Lead in exchange, 3 1/2¢ per lb.

Solder—

1¢ @ 1¢..... 13¢ @ 14¢

No. 1

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

<https://books.google.com>

